

**digit**

February 2009

# Fast Track *to*

# LINUX

## A BEGINNERS GUIDE

**Introduction to Linux**

**Installing Linux**

**Getting started**

**The command line**

**Customising Linux**

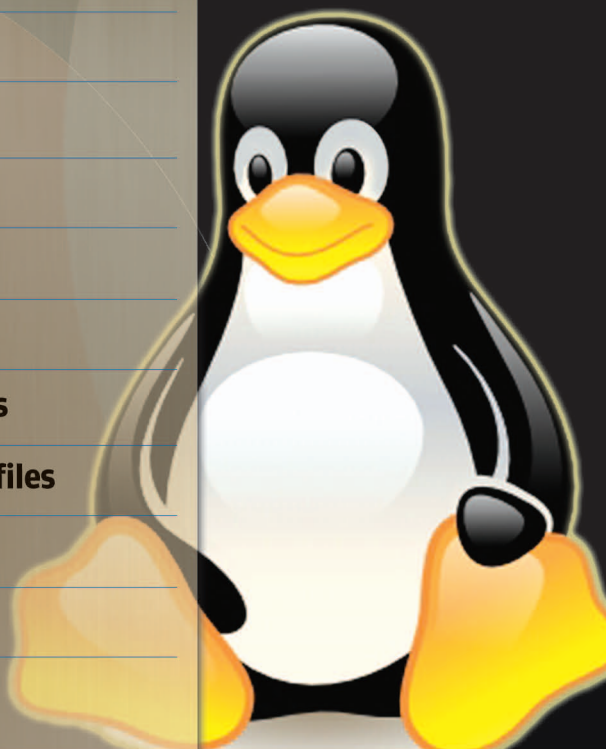
**Installing software**

**Working with images**

**Working with audio files**

**Working with video**

**Gaming on Linux**



**YOUR HANDY GUIDE TO EVERYDAY TECHNOLOGY**

# Fast Track to **Linux**

By Team Digit

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# Credits

## The People Behind This Book

### EDITORIAL

Editor-in-chief  
Assistant Editor  
Writer

Edward Henning  
Robert Sovereign-Smith  
Aditya Madanpalle

### DESIGN AND LAYOUT

Layout Design  
Cover Design

MV Sajeev, Soumya Mohanty  
Rohit Chandwaskar

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## Introduction

The last time we gave a Fast Track to Linux, Linux was still something only for geeks, and a fairly complicated undertaking. Linux has changed a lot since then, and evolved furiously as an OS that can give competition to the likes of Windows and OS X. Most prominently, the Ubuntu distribution (or distro) has become one of the most widely used Linux distributions. If any Windows user wants to switch to a Linux distro, Ubuntu is the distro that person is most likely to try out. Ubuntu lives up to its claim as being Linux for human beings, but what has helped the proliferation most are the free DVDs and CDs that are mailed to users by the parent company. Almost any net user moderately interested in technology has tried out a Live CD of Ubuntu at one point of time or another.

At the same time, other important distributions have evolved too. This includes OpenSUSE, Mandriva (formerly Mandrake) and Sabayon. Gone are the days when running a Linux operating system meant that most of the operations had to be managed through the command line. The Linux Desktop, in other words, the GUIs have also evolved, with Gnome, KDE and XFCE establishing themselves, and providing as much eye candy as Vista or OS X in their latest releases. The onset of Web 2.0 has provided the open source community with more tools to converge and co-ordinate their efforts, which has increased the amount of tools available for Linux by leaps and bounds.

What this means for the end user is that Linux has arrived. There are versions of Linux that are idiot friendly, versions of Linux that make you feel at home in a Windows-like environment, and even versions of Linux that come with propriety codecs included.

One of the biggest apprehensions about Linux is that its free so it must be bad. This is untrue. Consider the work on the source codes of Linux distros and programs as a large wiki. Since mistakes and bugs can be seen by everyone, they get ironed out quickly. A passion for working at it, and creating a software that can outdo a commercial version has resulted in a lot of quality software for Linux.

These vary from multimedia editing, enterprise management, database management, scientific tools, computer aided design

(CAD) to highly specialised software for niche requirements. You may have noticed the dramatic exclusion of games from the list. If you want to play a lot of games on your computer, Linux is not for you. Very few big publishers release games for Linux (id Software being one of them), and this is mostly because the market for Linux games is very small. That does not mean that there are no games for Linux, but games with the bells and whistles that can exploit your graphics card to the fullest do not exist.

Linux is also not for some specialised professional use. This includes layout artists, graphic designers and multimedia editors. Although competent programs are available for home use, Gimp or Inkscape do *not* really measure up to Photoshop or Corel Draw, and there is definitely nothing that comes close to the utility of Quark Xpress and InDesign. There are ways to emulate the windows environment to get some of these programs to work on Linux. You can also purchase some software for Linux, like Corel Draw and Maya. These are small issues. There is plenty of reason why you should use linux.

Linux is no longer the domain of the technological elite. There are many distros that can be used by “human beings” for regular day-to-day purposes.

It is a great and cheap solution for office use. Linux can be used to revive and use an outdated computer system that no longer supports the latest release of Windows. The upgrades are regular, and easily manageable. You can carry around your system on a portable hard disk, and use it on every system you connect it to, without changing the system.

This is technically possible for Windows too, but is illegal. Most importantly, Linux is free, and you own your copy. You can do whatever you want with it, install it on as many machines as you please, and not bother to read the fine print in the process. You certainly cannot be on the wrong side of the law when you run Linux.

## CONTENTS

<b>Chapter 1</b>	<b>Introduction to Linux</b>	<b>9</b>
1.1	Unix, Linux and GPL	9
1.2	Choosing a distribution	12
1.3	The Linux Desktop Environment	16
1.4	Linux Mythbusting	21
<b>Chapter 2</b>	<b>Installing Linux</b>	<b>23</b>
2.1	Installing Linux on your hard drive	23
2.2	Installing Linux using Virtual Box	26
2.3	Dual OS Installation	31
2.4	Installing Linux on portable memory	34
<b>Chapter 3</b>	<b>Getting Started</b>	<b>37</b>
3.1	Connecting to the Internet	37
3.2	Customising the theme	41
3.3	Customising the panel	43
<b>Chapter 4</b>	<b>The Command Line</b>	<b>47</b>
4.1	File and navigation	47
4.2	Networking and the Internet	48
4.3	Archive management	49
4.4	Sundry commands	50
<b>Chapter 5</b>	<b>Installing software</b>	<b>53</b>
5.1	One-click installation	53
5.2	Installing from packages (.rpm or .deb)	57
5.3	Installing from source tarballs	61
5.4	Command line installation	64

<b>Chapter 6</b>	<b>Working with Images</b>	<b>67</b>
6.1	Transfer images from a camera	67
6.2	Organise images with f-spot	69
6.3	Edit images on Gimp	73
6.4	Upload images to Picasa	77
6.5	Make a multimedia slideshow with Diascope	79
<b>Chapter 7</b>	<b>Working with audio</b>	<b>83</b>
7.1	Install the MP3 codec	83
7.2	Play music files with Amarok	84
7.3	Transfer music to your PMP / How to use your iPod on Linux	86
7.4	Edit audio files with audacity	87
<b>Chapter 8</b>	<b>Working with video</b>	<b>91</b>
8.1	Installing a video player	91
8.2	Installing Video codecs	92
8.3	Transferring video from a camera	93
8.4	Video editing on Linux	95
8.5	Transcoding Videos	97
<b>Chapter 9</b>	<b>Gaming on Linux</b>	<b>99</b>
9.1	Using Wine to play windows games	101
9.2	Using Dosbox to play DOS games	105
9.3	Using NES emulator to play NES Roms	108

# Introduction to Linux

## UNIX, Linux and GPL

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Two important developments in modern computing occurred in 1969 at Bell Labs, a part of AT&T. A team developed the UNIX operating system, and the C programming language. The two combined are the foundations of modern operating systems. Unix was designed in a way to be implemented both on servers, as well as computers meant for individual use. The single most important contribution of UNIX, was to create standards on which independent software and hardware manufacturing companies could work on. This basically meant that a software programmer in one country knew his program would work on hardware from another country. UNIX was very influential, and widely used because of the complete documentation provided with the operating system.

Another important aspect of UNIX was the way it allowed computers to interface with each other. UNIX allowed tasks to be shared over a network, and thus lay the foundation of the Internet. Before UNIX, most operating systems were written in assembly level languages. An assembly level language is specific to the hardware for which it is written. If say, a game is written in an assembly language, then the game will run only on the hardware for which it is written, and not run on any other hardware. This means that any application written in an assembly language is not portable. The same holds true for operating systems as well.

UNIX was the first operating system to be written in the C programming language — a high-level programming language — which made UNIX portable. For the first time, a single operating system could run on different hardware, independent of the architecture of the computer system. Strictly speaking, an operating system written in a higher-level programming language compromises on a lot of benefits of operating systems programmed on assembly level programming languages, particularly noticeable in computing speed. Because of the way computers have grown though, this difference is no longer important, and C itself is considered a low level programming language because of the ease at which it can operate with a wide range of hardware.

UNIX was instantly picked up and widely used, spawning a lot of clone and derivative works. The derivatives include Sun OS, Solaris and BSD (Berkely Software Distribution). All of which are



operating systems based on the UNIX code. The Mac OS, and early versions of Windows too, were based on the UNIX code, the edge being in the GUI they provided.

BSD was one of the first operating systems to embrace the concept of open source and free software. BSD's license is still preferred on some points over the GPL license used by Linux, because it allows third party propriety software to interface with the operating system. BSD allows for derivative works to be used for commercial purposes, something specifically disallowed by the GPL, and thus many consider the BSD license to be more free than the GPL. BSD was the first operating system to implement IP protocols, which enabled a smoother connection between computers, and is the standard now, as this allowed files to be written and accessed across a network as smoothly as a native hard drive.

GNU (Gnu's Not Linux) and Minix were two important Unix clones. GNU pioneered the free software movement, making sure that the operating system itself, and all derivative works were free and open source for everyone. This meant that no one could ever use GNU for commercial purposes. The project lapsed into technical difficulties and was never successful, except in the spread of its philosophy. Minix was an operating system developed for educational purposes. Andrew S Tanenbaum released the operating system under the BSD license, to accompany his text book on writing operating systems. Minix gathered a lot of interest, and was one of the inspirations for Linux. Note that both GNU and Minix used no code from UNIX, and were totally different operating systems, although they are referred to as being UNIX-like.

In 1991, Linus Trovalds used the Minix usenet group to introduce, discuss and reveal the early versions of the Linux Kernel. Linus began to use Minix on his home computer, because he wanted to use UNIX, on which he was working at the University of Helsinki. But the source code of Minix was not entirely available, so Linus started writing his own. What followed was one of the earliest and most infamous flamewars in Internet history, between Trovalds and Tanenbaum. The issue was a very technical one, on what kind of operating system was better, a monolithic kernel like Linux, or a microkernel based OS like Minix. A microkernel excludes elements like device drivers and inter-process communication from the scope of the operating system, putting the onus on the user. This debate has still not settled, but Linux is by far the more proven and popular operating system. To Tanenbaum's cred-

it, however, the micokernel approach highly reduces computer crashes, and the small number of lines of code in the operating system makes it more bug free.

Trovalds borrowed heavily from GNU, using a lot of existing free software, including the compiler, which is a basic component of the Linux kernel. This includes the glibc library, which is the GNU library for the C language. Linux was instantly picked up by the Open Source community, and developed many flavors or distributions. The early ones included SLS (Softlanding Linux System), Slackware, OpenSUSE and Red Hat. Currently, there are more than 350 Linux distributions, with different releases, offering varied degrees of support, and suitable for many needs.

One of the mainstays of Linux has been the GPL license. The GPL license, is like the EULA (End User Agreement License) of proprietary software and operating systems, only without the restrictive terms and conditions. When you buy a disc with the Windows installation, for example, you don't buy the operating system at all, but a license to use the operating system on a single computer. You are not allowed to install the operating system on multiple machines, share it with friends, or modify it for individual use. Restrictions include something as basic as changing the interface and how it looks. The GPL license on Linux does away with many of these restrictions. That does not mean the the GPL itself is without any problems. GPL is highly controversial within the open source community itself, and amongst software developers in general. Many claim that the GPL has no legal weight whatsoever, and software released under the GPL are essentially ambiguous in license or public domain. The GPL does not protect contributors to a project that is falsely released under the GPL by an unscrupulous programmer. Since anyone is allowed to modify and redistribute software, GPL makes original developers almost anonymous. Due to the many shortcomings of GPL, Linux is licensed under GPL v. 2.0, whereas a later version of the license is available and used as the license for many a Linux based software. However, the GPL is still a robust, well established and open license for software distribution, and one of the reasons why Linux has risen in popularity. It allowed adopters of Linux to make changes, and re-release, spawning a horde of Linux distributions.

There are also commercially supported distributions, which have helped the spread of Linux the most. These include Red Hat, SUSE, and Ubuntu. Many companies have switched to Linux as a

cost saving measure, and Linux bundled with netbooks are very popular, as this significantly reduces the price of the devices. Ubuntu is the most common distribution nowadays, because of its user friendliness and the ample support available on its forums.

Linux has found its way to cell-phones, desktops and office computers. The governments of many third world nations like Brazil, Spain, China, Peru, Pakistan and India are actively involved in promoting Linux and associated open source software. The French parliament works off Linux, and the entire city of Vienna has decided to take the plunge. Using Linux really puts you in better company, if not for ideological and political reasons, there are technological reasons as well. Linux is the most used operating system on supercomputers around the world, and the behemoth of modern technology, the LHC itself is controlled by Linux.

### Choosing a distribution

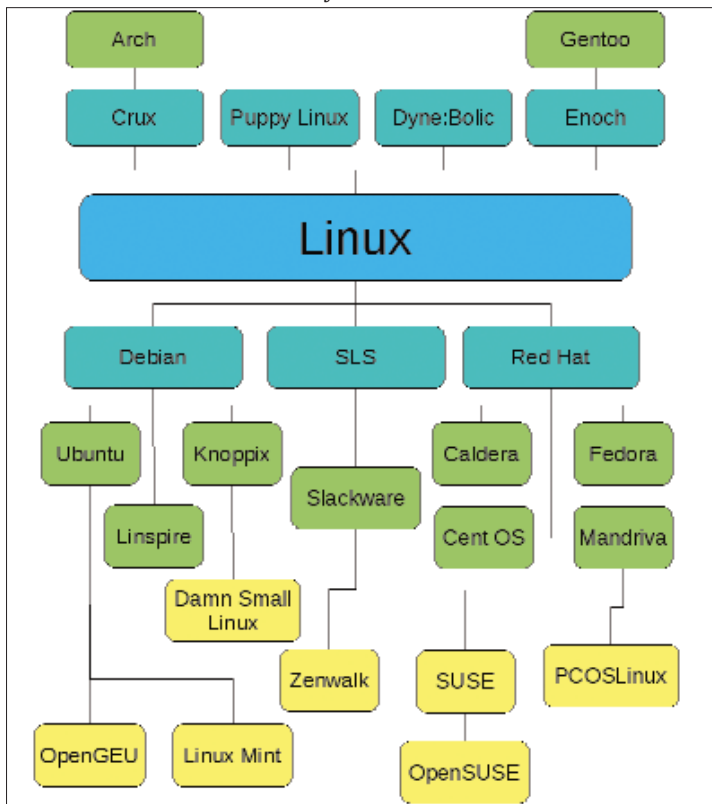
A Linux flavor or distribution (commonly referred to as a distro) is a specific set of software, windows management system, and a desktop environment packaged along with the Linux kernel. There are a wide range of distros available, for a wide range of specific and generic purposes.

For example, a non-commercial, highly-portable distro for a desktop would be Puppy Linux. A very comprehensive, non-commercial desktop distro would be Debian, and a commercial, very secure, enterprise distro would be SUSE. There are many permutations and combinations, as well as fundamentally different philosophies. Some distros are available only in their home language, for example, the Malayalam distro, Rachana, and the E-Swecha Telegu distro which is in development. There is a small, portable, multimedia centric distro called GeexBox, and Gentoo, a distribution that compiles the source code based on the hardware it is installed on, making it highly optimised for performance.

Distros of Linux have been around almost as long as Linux itself, and many distros have spawned child, grandchild and even great-grandchild distros. One of the big differences affecting end users are how installation files for software are distributed for these distros, and there are two families, rpm-based and deb-based. Debian and its derivatives used the deb installation, which includes Ubuntu. Most other Linux distros use the rpm packaging.

A distro typically has a mechanism for resolving dependencies, which are like .dll files for Windows. This can range from *yum* in

rpm-based distros like Fedora and SUSE, and *apt-get* for Debian and Ubuntu. A good choice of a distro can be made after understanding their roots, and where the distros come from. This chart outlines the main distros and how they evolved.



Arch Linux is one of the biggest proponents of the KISS principle, which stands for Keep it Simple, Stupid. Contrary to common sense, the distribution is actually pretty difficult to learn and has a huge learning curve. The KISS principle refers to the design of the software itself, and not how idiot-friendly it is. Arch Linux is a lightweight distro, and advisable for those users who are comfortable with the command line and want to move on from Ubuntu or SUSE. The great thing about Arch Linux is that it has a dependency resolver, as well as repository

ries, something that is rare amongst distros that embrace the Kiss principle.

Commercial Linux Distros often have the disadvantage of competing with distros that rebuild the same code and distribute the operating system for free. CentOS is an example of this phenomenon, which is a slight variation of the Red Hat Enterprise Linux. However, the popularity of Red Hat is still far greater because of the support Red Hat offers, tearing down the myth that open source software is not commercially viable. CentOS releases tend to follow close on the heels of a new Red Hat release, and is meant for enterprise computation. The distro is rpm-based and uses yum to resolve dependencies and handle packages.

Debian is a large, comprehensive distro, driven by a dedicated community of volunteer developers. One of the biggest success stories of Linux, a large number of distros are derived from Debian. Packages are handled in the .deb format, and the default dependency resolver is apt-get. There have been ports of Debian to different kernels as well, including BSD and GNU. Debian is usually used with the Gnome Desktop Environment, which is common to many of the distros derived from Debian. Debian has regular releases, with one of the largest software repositories.

Fedora 10 has been released recently, and is one of the most common distros for servers. Fedora has a large repository, uses rpm packages and yum to resolve dependencies. Fedora is the distro of choice for the creator of Linux, Trovalds himself. Fedora comes with a choice of KDE and Gnome desktop environment. Fedora is a mature and robust distribution to try out.

Gentoo has a novel approach amongst distros, where every software, and the operating system itself is compiled and optimised for the hardware on which it is running. This is achieved by an engine called catalyst. This means that Gentoo is the distro for power users who want to get the most out of their operating system. Although packages take a lot longer to install on Gentoo because of the added compilation time, the very latest builds of software are supported by this distro because of the way it is built. For example, although OpenOffice.org 3.0 was available by the time Ubuntu 8.10 was out, Ubuntu 8.10 was not able to include the latest version of OpenOffice.org along with the distro. Linux Mint 6, which is based on Ubuntu 8.10, also could not offer the latest version of OpenOffice.org. Such restrictions are absurd for Gentoo, and the latest releases of all software can always be compiled on this distro.

Knoppix is one of the first distributions to make Live CDs popular. A Live distro is a Linux distribution that can boot off the CD Drive, and operate through the RAM, without writing anything to the hard drive. Knoppix is Debian-based, and is still one of the most popular Live CD distros around. The biggest advantage of Live CD distros is their ability to recover data from a hard drive after an operating system crash.

Linux Mint is a distro based on Ubuntu, and has its own repositories, but also supports Ubuntu repositories. It is even simpler to use than Ubuntu, for two reasons. There are a whole bunch of customisation tools available for managing the OS, and many codecs are available out of the box, which makes Linux Mint unique as most distros do not ship with codecs to avoid lawsuits, because the codecs are proprietary. The distro is one of the few good-looking ones out there, and supports XFCE, Gnome and KDE.

Mandriva is a commercially backed OS, based on Red Hat. It is optimised for system administrators, and uses urpmi or rpmmandrake to manage dependencies. It is an rpm-based distribution. Mandriva used to be called Mandrake, and is one of the more common distributions around. Mandriva also released a commercial gaming edition.

OpenGEU is another Ubuntu-based operating system that aims to look good, building up on the user friendliness. The current version of OpenGEU is based on Ubuntu 8.04, the version based on Ubuntu 8.10 is still under development, and will be heavily outdated when it does come out. However, OpenGEU uses the capabilities of the Gnome desktop environment to its fullest extent, offering desktop widgets and a OSX-Style dock bar.

OpenSUSE is a very common and popular distro. It is based on Slackware, and there are regular updates available. There is a very active community around OpenSUSE, comparable to the community around Ubuntu. It is one of the more common rpm-based distros, and uses yum for resolving dependencies, but this is not installed by default. It is an easy distro to handle by most standards, but installing software and codecs can be more of a headache than Ubuntu for Linux novices. Both Gnome and KDE are available as a choice at installation.

PCOSLinux is a Linux distro designed to make the transition from Windows to Linux a smooth experience. PCOSLinux emulates the way Windows looks on Gnome or KDE, and is based on Mandriva.

Red Hat Linux is another Linux success story, a commercial, enterprise-level distro for mainframes. The distro itself came at a fee, but the source code was available for everyone who brought it, allowing a whole range of distros that just rebuilt the code and redistributed. The changes in the rebuild are usually limited to removal of Red Hat trademark logos and graphics, replaced by other logos and graphics. However, Red Hat made considerable profits by giving support to its customers, and charging a fee for upgrades.

Slackware, a great distribution for those who want to jump in at the deep end to start learning Linux, is another distro that adheres to the KISS principle. Slackware is a very simple distro, in the sense that it compromises on user-friendliness by providing an essentially stripped down version of Linux, with a simple desktop environment and no repositories or mechanisms for resolving dependencies. Those who use Slackware will have to start from scratch, which makes it both a great test bed, and a good starting point for those who want to learn the intricacies of Linux. It has a very loyal community, and is the oldest Linux distribution in active development.

Ubuntu changed the OS landscape by offering to ship free CDs to people's homes. Backed by a multi-millionaire by the name of Mark Shuttleworth (who owns a Formula 1 team amongst other things), Ubuntu introduced Linux to a new non-geek audience. Living up to the title of "Linux for Human Beings", Ubuntu was singlehandedly responsible for demystifying what appeared to be a complex OS, and has gathered around it one of the most powerful Linux communities. Support is readily available for a lot of issues, and the distributors themselves offer professional support for a fee. Ubuntu is Debian based, and uses apt-get to resolve dependencies.

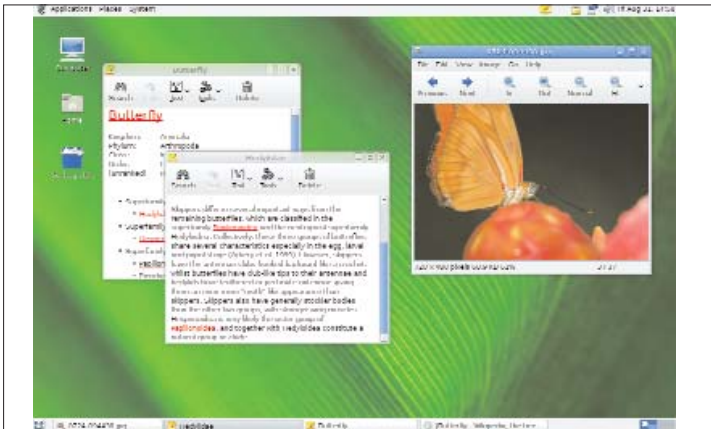
After all the considerations, if you still cannot decide which distro to install, we will make a call for you. All said and done, the best distro for home use, for novices, is Linux Mint. This is because it is based on Ubuntu, which makes it easy to start off with, has the added advantage of looking good, and has a large number of software in its repositories. More importantly, it comes with more codecs installed, and consequently, plays more movies and music out of the box than Windows Vista.

### **The Linux desktop environment**

A desktop environment is a fundamental feature to most modern operating system. It is the interface between the user and the oper-

ating system. The desktop environment, literally simulates a desk on the monitor of the computer, with folders, documents and applications like word processors. Desktop environments display the toolbars, icons, windows and animated effects in different ways. A desktop environment is a graphic interface that lets the user work with the operating system. Windows and OS X come with a single desktop environment, that can be themed, but not altered in the amount of resources they use, or the global options available for applications. For Linux however, a range of options are available. Most Linux distros offer users a choice between GNOME and KDE.

## GNOME

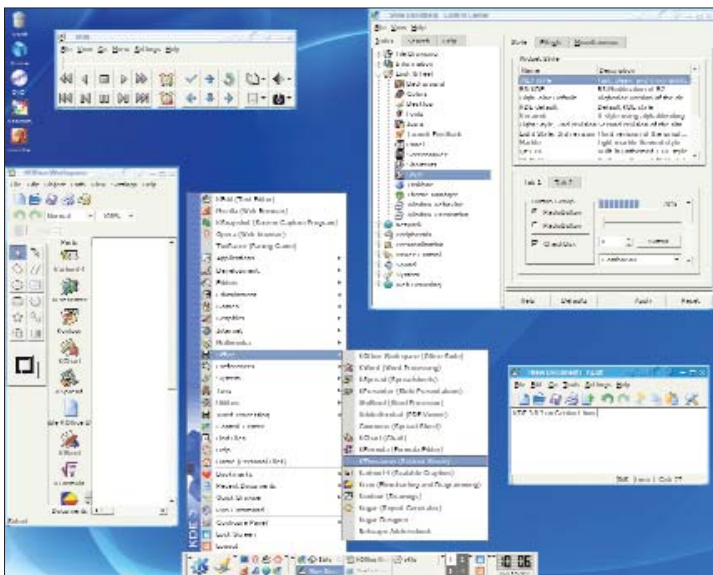


GNOME (Gnu Network Object Model Environment), is one of the two most common desktop environments for Linux. It is a desktop environment for UNIX like operating systems, and works for GNU as well as Solaris. The GNOME Human Interface Guideline (HIG), is a set of rules that act as a benchmark for GNOME itself aims to achieve, and what competing desktop environments also consider. GNOME looks and feels like the Mac OS X, with the menu bar being along the top edge of the screen. There are a bunch of programs that come with GNOME, most notably, Nautilus, a small and swift file browser. GNOME is also bundled with f-spot, one of the most used photo management software for Linux. Gnome comes with Brasero, which is not as good a burning software as



K3b. There are a huge number of applications written for GNOME, but KDE has more. GNOME does not have all the razzmatazz of KDE, but that means that GNOME is less of a resource hog, and works better on old or slower machines. Although GNOME came out later than KDE, it is a mature and robust desktop environment and is prone to far fewer crashes than KDE. GNOME does not offer as many customisation options as KDE, but strictly speaking, since the source code is available for everyone, you can do practically anything you want with it.

## KDE

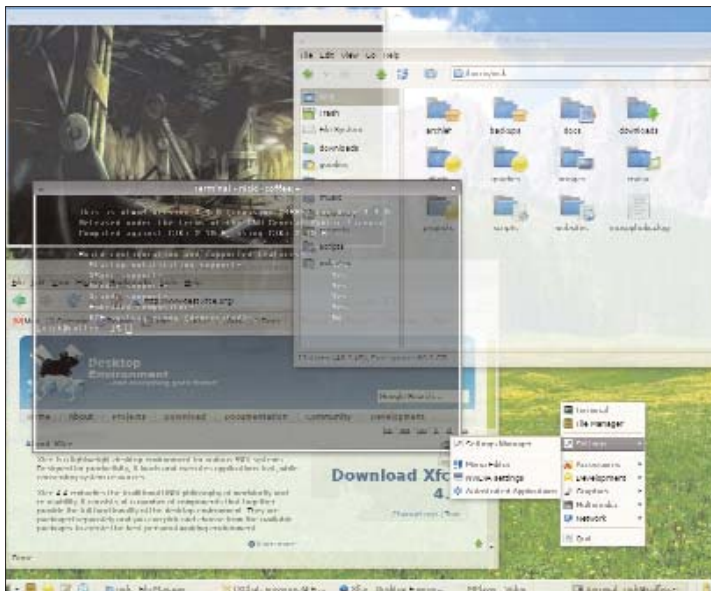


KDE is also one of the two most common desktop environments for Linux around. It was released a year before GNOME, and stands for the K Desktop Environment. There are a lot more applications written for KDE than for GNOME. KDE also comes bundled with the most used MP3 player for Linux, Amarok, and the popular burner k3b. Amarok is the mp3 player of choice, more preferred to Rhythmbox, which is the GNOME default. KDE looks and feels like Windows, and Windows users are more comfortable starting off on Linux with KDE. It is customisable on many levels, and offers a lot of in-depth tweaking features. Since KDE comes with a lot of bells

and whistles, it is more heavy on system resources, and is inadvisable for less than 256 MB of RAM. Most Linux software or distros with the word K before their name means they are meant for KDE, or use KDE. This includes web browsers like Konqueror and distros like Kubuntu. Strictly speaking, GNOME applications run well on KDE and vice-versa, the consideration here is really system resources at your disposal, and how you want your desktop environment to look.

There is a long, ongoing war between KDE and GNOME. We cannot make a call here as really, such a matter is best left to individual needs and tastes. However, what we will say is that if you are willing to experiment, there are other fish in the sea, some of them using less memory than GNOME, or offering more eye-candy than KDE.

## XFCE



XFCE is one such desktop environment. It is a very small and lightweight desktop environment. To give an idea of how small, GNOME takes up 180 MB of space, KDE takes up 210 MB of space, whereas XFCE takes up just 15 MB of system space. XFCE does not come

bloated with software that is forced on the user, which appeals to the Linux philosophy of customisation. This means if a user prefers f-spot (GNOME) instead of Gwenview (KDE) and Amarok (KDE) instead of Rhythmbox (GNOME), the user is free to install these software without having to uninstall competing programs, or keep two programs that serve the same purpose. XFCE is more stable than both Gnome and KDE, and includes a number of special effects like shading and windows animations. A number of respected distros use XFCE, including Slackware, Debian XFCE, dyne:bolic, Xubuntu and Linux Mint.

## Other desktop environments



The Desktop Environments listed here are not as widespread or mature as the desktop environments discussed above, but they are all considerably lightweight, some smaller than XFCE as well. This is mostly because a lack of bundled software, but that is not really a problem as most people would want to choose the software for their needs according to individual requirements and preferences. Etiole is a desktop environment that stands out in terms of customisability. It does not take anything for granted, and you can represent almost anything you want on the desktop in your own way.

While being minimal and simplistic, Etiole allows for a very high level of customisability. Enlightenment is another pretty boy desktop environment, also lightweight, used as a default in the OpenGEU distro. Unique features include grouping windows together to perform the same operations on them (you can resize your browser, your word processor and your chat client at the same time) and the ability to strip windows of borders and buttons. Blackbox is a large, open desktop environment, with emphasis on being lightweight. Fluxxbox and Openbox are derivatives of Blackbox. Ion is the geek's desktop environment, allowing for efficient navigation for the keyboard warrior. Ion is also very lightweight, minimal (there is no start menu by default) and blocky.

### Linux mythbusting

There are a lot of Linux myths floating around, and by and large, it is one of the most misunderstood operating systems around. Linux is not better than Windows. No one can claim that Linux is faster or Windows is faster. There is a threshold speed at which computer users can operate a system, to start off with and you really cannot go beyond that. Though it is true that Windows uses far more system resources than a Linux distribution, Linux simply does not do everything that a Windows system does. Games are just a starting point, although KDE or XFCE are elegant desktop environments, they really is no free desktop environment that comes close to what Windows Vista's Aero or OS X's Aqua have to offer. It is true that Linux can be used to effectively salvage an old computer, you won't be able to do too much with it. For example, advanced operations on Gimp will be much slower on an old computer, and many desktop environments and distros simply will not run on anything less than 256 MB of RAM, which is supposedly one of the greatest plus points of Linux. The transition from Windows to Linux is not smooth at all, no matter what you might have heard. OpenOffice.org has as much feature bloat as Microsoft Office, and there are many subtle changes in the behavior of these office suites that will definitely reduce productivity after taking the plunge. Moreover, it is simply not true that Gimp or OpenOffice.org come anywhere close to the functionality of the latest releases of Photoshop and MS Office.

Another big myth is that Linux is free. There are a lot of Free distributions available, but many of them charge for support (even popular ones like Ubuntu, Mandriva and SUSE have commercial

interests), and the more functional and feature rich distros have to be purchased. Because of the way the Linux kernel itself is licensed, the source code will always be provided with such distros, and you can do what you want with them. While taking a corporate decision to switch to Linux, considerations such as the time taken to adjust to Linux, train employees, and the reduction in productivity in the interim period have to be considered.

Linux is not for geeks only anymore, and the lay man can use it, but all the good things about Linux are beyond the scope of the lay user. The best example of this is the open source code, most users of Linux will not know what to do with it, and will never want to know either. Installing, using and finding applications are no longer difficult in Linux, but they are not as easy as doing the same for Windows either.

Linux is not entirely bug free, and there are as many obscure pop-ups and system error messages as Windows. Linux also crashes pretty frequently, and such moments can be extremely frustrating and stop a beginner from sticking at it.

A Linux installation, when inexpertly handled, can mess up your hard drive. Even if your data is backed up, you might see a portion of your hard drive mysteriously disappear after you have installed Linux and then go back to Windows. On a day to day basis, your computer technician will begin to hate you if you install Linux then call him for help. More true for your ISP provider, who might be as confused as you are in case you run into connectivity problems. Installing codecs on your Linux distribution is notoriously difficult, and although a lot of support is available on forums across the Internet, they are so technical in appearance, that it is enough to scare a new user away. You absolutely need an Internet connection for installing most software, because of the way the dependencies have to be resolved in almost every distro available. Most importantly, don't expect to work on Linux without getting down and dirty with it, that is going into the command line, tweaking around with root access (which can really mess up your system) or basically being ready to learn a bit and get deeper into the heart of computing.

There needs to be at least a small techie in your heart for you to flirt with Linux, despite what anyone claims. Linux still has a long way to go before it can be at par with the latest releases of Windows or Mac OS, and Trovalds is taking his own sweet time making everyone wait for Linux 3.0. That said, it is not that difficult a thing to handle, and at times can be a very rewarding experience. So, let's start getting down and dirty.

# Installing Linux

## Installing Linux on your hard drive

---

This is a step-by-step guide to install Linux on your hard drive. Try this on an old machine or a laptop first, before choosing to migrate Linux to your desktop. There are methods of trying out a distro before installing it, which includes using a Virtual machine like Virtual Box, which is explained later on. Another way is to try out a Live CD, or boot from the CD itself. This works for the DVD and CD isos of most modern distros, but not all. In fact, some distros are only live versions and cannot be installed. This is a step-by-step guide to install Linux Mint, but the procedure is essentially the same for most distros.

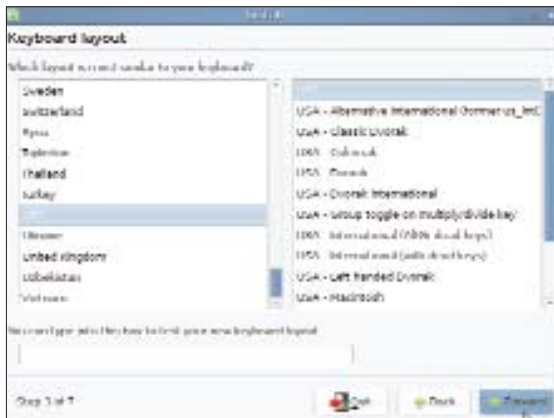
The first step in any Linux installation will be choosing a language. Most distros ship with a number of Languages, and European languages are the most established with a large community support base for each distro. Choose English as the language, and go to the next step.



Step 2 involves selecting a time zone. Normally a world map, with a magnifying glass appears. Click on India, and Kolkata or Calcutta will be selected automatically. Even if you live in any other city, this is the standard time zone for Indians across most of computing. Make sure that you have not selected Colombo or some other city by mistake. Also make sure that you select Kolkata after zooming in.



The next step is selecting the keyboard layout, which is USA-USA for the standard QWERTY keyboard. Advanced options are available include mapping individual keys, so it is possible to take out all the keys on the keyboard, put them back in different locations, and remap the keyboard. Just because you can do it, you don't have to.



Step 4 is creating a partition table for installation. Don't worry at this step, if you have chosen to install Linux on your hard drive, you probably have backed up all the data that is important. If not, then install Linux by using Virtual Box, and skip this method. By default, Linux makes space for itself from the space available. This is done by resizing an existing partition.



Instead of this, choose Guided and use the entire disk. At this point you can click on Manual, which allows you to demolish the existing partitions and create new ones. To keep things simple, you can choose to use the entire hard disk as one partition, or split it up into two partitions.





Linux will now show a summary of how the installation is going to change the system, and options to fine tune and edit the partition. Now a swap partition is the equivalent of virtual memory on the system. If you are installing Linux on a large hard drive, allocate a reasonable amount (less than 5 GB) of space for the swap partition. If you are using a netbook or a laptop with a small hard disk, but plenty of RAM, it does not make sense to allocate any memory to the swap partition. If you choose not to allocate space for a swap partition, you may be prompted about the decision. Ignore such prompts, and continue.



That is it! Linux will now be installed on your system, and the next time you start up, Linux will boot from your hard disk.



## Installing Linux using VirtualBox

If you want to try out Linux without damaging your existing system, using VirtualBox is the easiest way to go about it. VirtualBox emulates a virtual machine on your computer, and saves all system files of another operating system into a single file on the comput-

er. So whatever you do inside the Linux system, does not really affect your Windows OS. Virtual Box is a 38 MB download from <http://www.virtualbox.org>, or you can just put our DVD into the tray. VirtualBox can also be installed on Linux for running Windows, or on Windows for running OpenBSD.



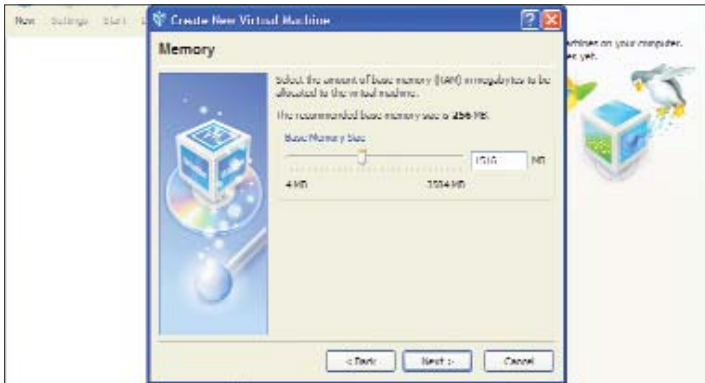
First install Virtual Box, then start up. Click on new, and the Virtual Machine wizard starts up. You can run a number of virtual machines, all with different operating systems using Virtual Box. For now, we will use one distro.

The next step after starting up the software is to choose an Operating

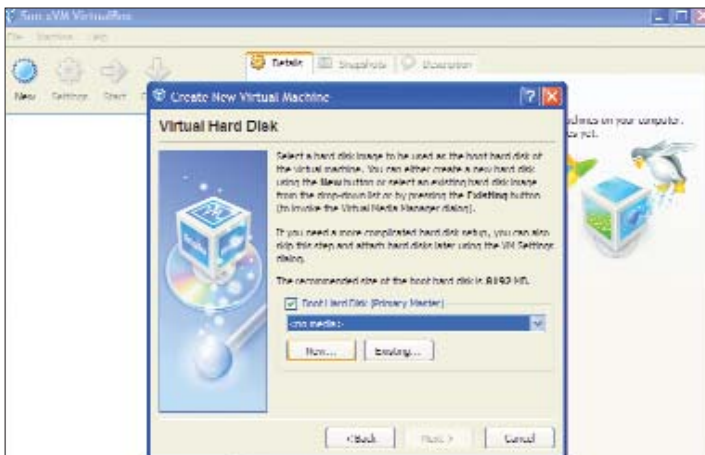
System and a Version. You can choose an Operating System and a Version. There is a long list of Linux distros, but the list is not exhaustive. If your distro is not listed, choose either the Linux kernel version number, or choose other. For this installation, we will be using OpenSUSE 11.1, but the method is the same for any other distro.



Click on Next. In this step, you will allocate a certain portion of RAM to be used by VirtualBox. Most operating systems have a minimum of 256 MB. Some Linux distros can go to as low as 32 MB. However, if you have enough RAM, allocate generously. If you have over 2 GB of RAM, allocate half of what you have. For anything between 512 MB and 2 GB of RAM, three-fourths of what you have is a safe bet. Never max out the RAM allocation, as the virtual machine will be running on top of your Windows System.



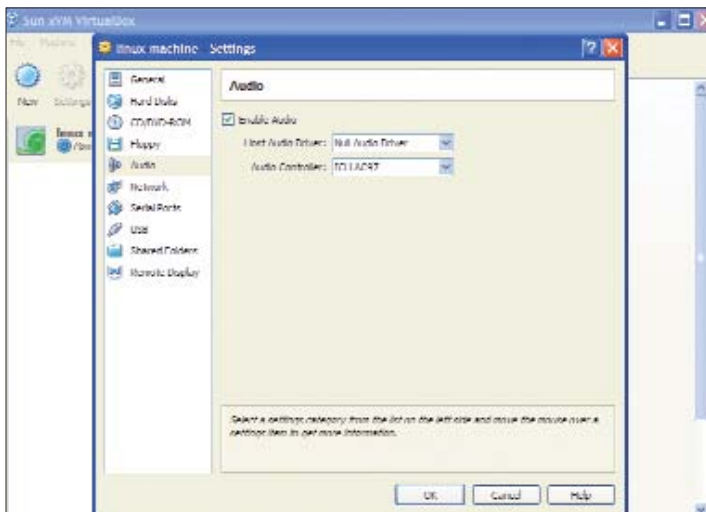
The next step involves creating a virtual Hard Disk. For the operating system that you are going to install, this is all the memory that it has. Any Linux Distro will work on something as low as 8 or 10 GB for sure, many go far lower. Allocating more than 15 GB does not make sense if you are going to use a virtual machine to run Linux, in which case, a dual boot would be more appropriate.



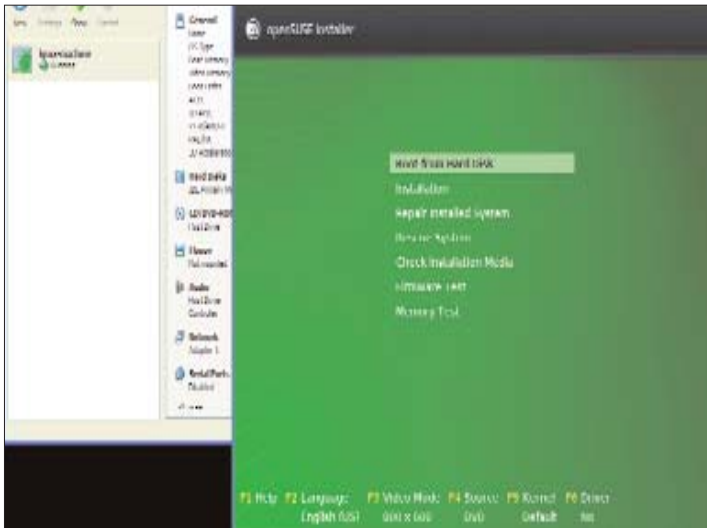
Choose “New” and select dynamically expanding storage. This means that although you have allocated 8 GB of space to the virtual Hard Drive, it will not actually use all the space on the system. The Virtual Hard Drive will occupy only as much space as necessary, and grow in size as and when you use Virtual Box to run the OS.



Go to the settings menu, and mount the CD Drive, USB drives and enable audio. This ensures that the Linux you will run is not a stripped down version and has access to many areas of the machine.



The next step, is to put the DVD/CD disk in the drive, and let the machine boot up. Fortunately, there is no BIOS setup involved, and any operating system is detected by default.



Continue installing the distribution as a Linux installation. Remember that SUSE in particular offers a range of desktop environments. If you prefer the lightweight XFCE over GNOME and KDE, or an older version of KDE, go to the “other” radio button while choosing a desktop environment.



That is it, now you can run Linux from a window in the Windows OS. To switch between the virtual machine and the Windows desktop, use the right control key (by default). To toggle the fullscreen mode, press the right control key and [F].

## Dual OS installation

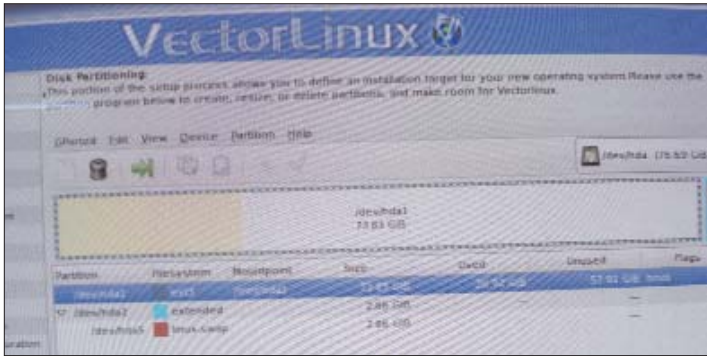
As long as you have enough Hard Disk space, it is possible to install two or more Operating Systems and distros on the same computer. The method for installing two or more operating systems is practically the same. What Linux does here is resize the partition to make room for itself. This works the same for a Windows OS, or another Linux Distro.

First, put the CD or DVD in the tray, and restart the machine. Before the OS boots, press [F12]. The loading screen of the distro should show up now. Choose to install the system, and go past the first few steps, which are the same as a fresh installation discussed before. The difference will be at the partitioning stage, where you will have to modify the partitions instead of using the preset partitions. The wording for this option may be different in different distros, but basically, you will have to choose to resize, modify or “make room” in the partition.

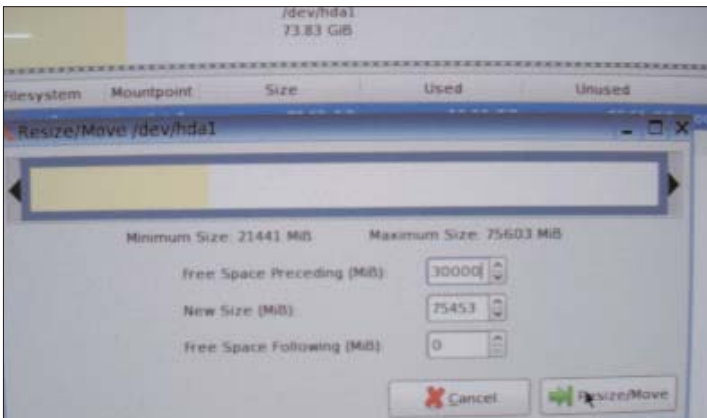


The next step is to choose a partition to modify. Choosing the largest partition is a good idea at this point. You might want to break it up into two parts, one for the system, and another for the swap space. Do not try this without backing up your data, although nothing will happen to the data if everything goes fine – it will still be in the regular locations. The only thing you will lose

in the previous OS is the amount of free disk space.

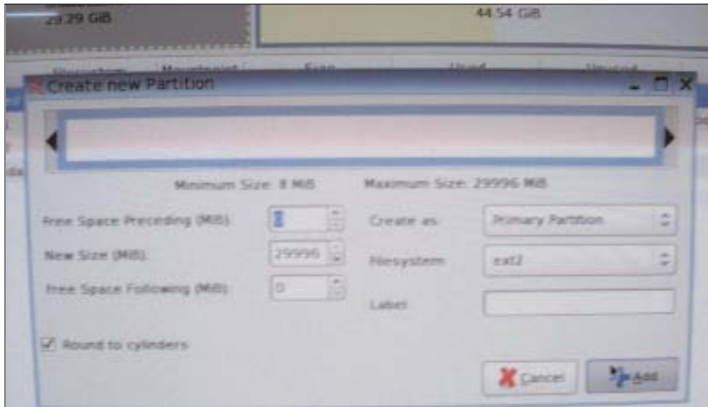


Select the partition to modify, then allocate a portion of it for the operating system. At a minimum, this space should be around 8 GB, but since you are installing an OS, something around 30 GB and upwards would be more useful and appropriate for long term use. Select the Resize/Move button to edit the table. Note that at this point of time, the partitions are not really being changed, but are represented on screen on what they will be after Linux changes them.

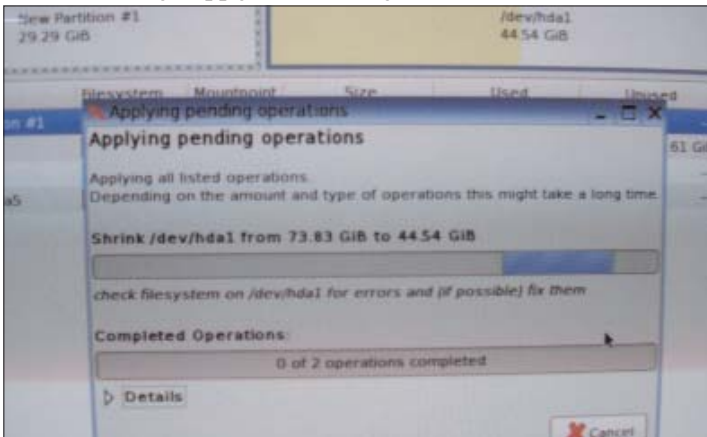


Select the space you have just created, and allocate it as the primary partition. You can also break it up to allocate more partitions, or a small space for the swap partition. Add or remove partitions, at this stage as per your preferences. Usually, one main par-

tition, and one swap partition should be sufficient.



The next step is a simple prompt asking if you are sure that you want to continue with the operations. If you are sure that you want to go ahead with the partitioning, click on OK, and go right ahead. The Linux partitioner (usually a program called gparted) will start working now. Halting the operation in the middle will have disastrous consequences on your hard disk. The extent of the disaster will be that a section of the hard disk will mysteriously disappear from your OS. Your files still won't be affected, but it is a good idea to do this operation when you are sure of a steady supply of electricity.





Now, every time you start up your machine, you should get a choice of operating systems to boot up. The application used for this is called Grub. Choose the OS of your choice from here and boot up.



## Installing Linux on portable memory

You can install some distros on portable memory. An 8GB USB stick is enough to carry around a personalised OS, files and a few games too. Some distros are made particularly to be portable, and there are portable versions of distros available, like OpenSUSE portable. Many small distros like Puppy Linux have an option to install on USB Drives, requiring as little as 1 GB of memory space to function. This tutorial shows how to install a USB version of Ubuntu from the Linux Mint distro. If you do not want to install Linux Mint or Ubuntu on your desktop, but want to install it on a USB drive, just put in a live CD in the tray and follow the same procedure.

Go to Menu > All and search for "make usb". If make USB Startup Disk does not appear in the list, go to application manager and search for USB creator, and select and install it. You will also need a live CD of Ubuntu for this step. This will work even if you have an image of Ubuntu, choose "other" and navigate to the image file on the system.



That's it. You can experiment with other small distros, but Ubuntu is a handy distro to carry around.

# Getting started

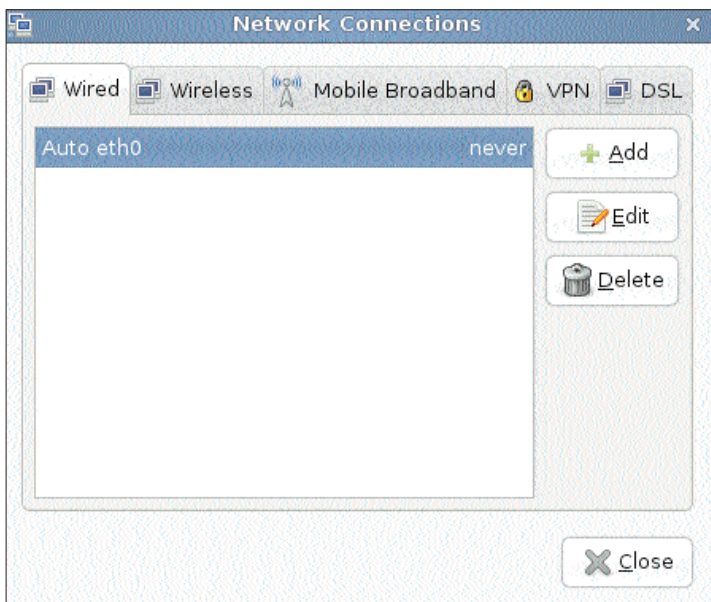
## 3.1 Connecting to the internet

---

Connecting to the Internet is essential for a distro to run smoothly, especially true if you are installing from a CD instead of a DVD. The simplest way to install software, and the mechanism for resolving dependencies is based heavily on having a net connection at all times.

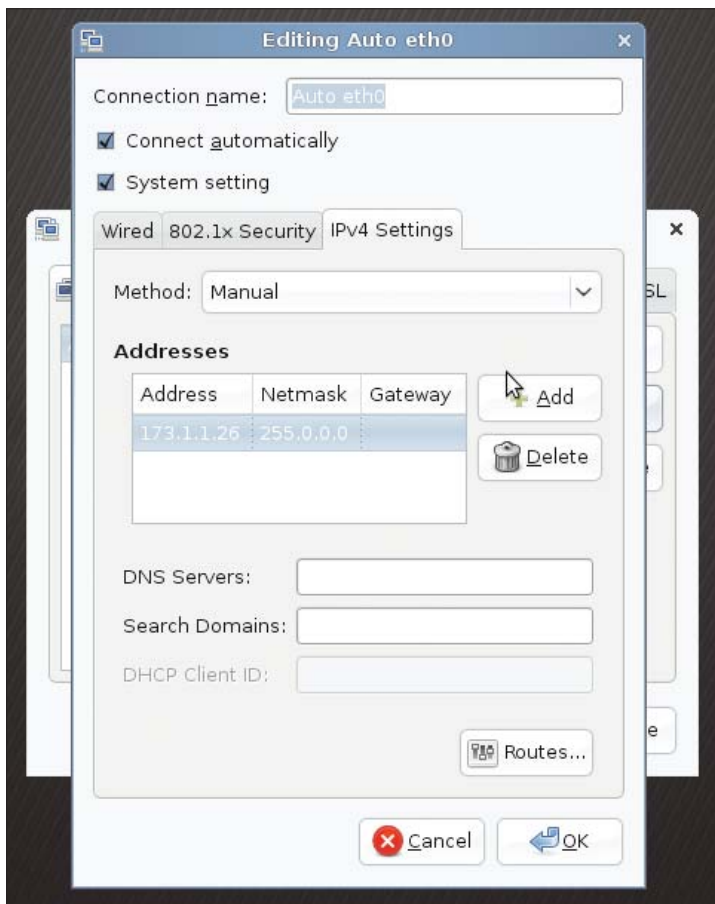
From the beginning, Linux was built for networking, so it is particularly efficient on the web. The default browser included with most distros is Firefox. Some distros like Debian however, have a re-branding called Iceweasel. However, derivative distros of Debian like Ubuntu and Linux Mint also provide Firefox. An Opera version is available, but the operation is a little buggy.

To set up a new Lan connection, the network symbol of two computers, one in front of the other, is used. Right click in the taskbar, and choose “edit connections”



Click on Edit, then go to Ipv4 settings. Change the Method drop down box from Automatic (DHCP) to Manual. Click on Add, then

edit the fields. Enter the IP address, the Netmask and the Gateway. Also enter the DNS address. Most Linux distros allow you to specify only a single DNS server, unlike Windows. However, you can add a number of IP addresses and associated configurations. Click on Ok, then click on Close.



If you need a special client to login to your service provider, you should be directed to the page when you start a browser. Many providers allow you to connect directly, without a client. If you are

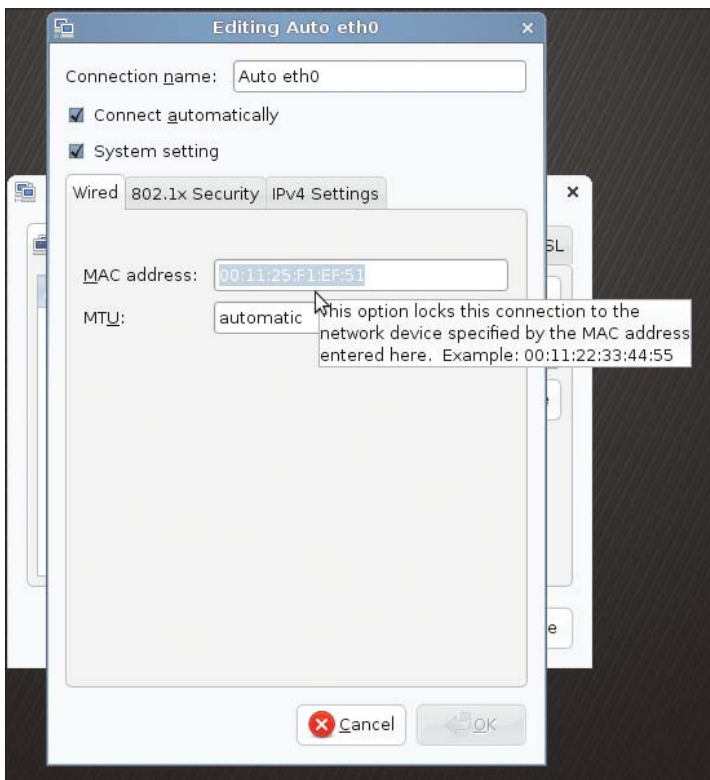
connecting from your laptop, while maintaining a windows desktop as the main computer, you will need to change the machine id of your laptop. This is because many service providers lock their connection to a single machine id. To determine the machine id of your Windows machine, go to run or cmd and type

```
ipconfig /all
```

In the list of figures, look for a line that says physical address, which should look like:

Physical Address. . . . . : 00-34-8B-0Z-42-09

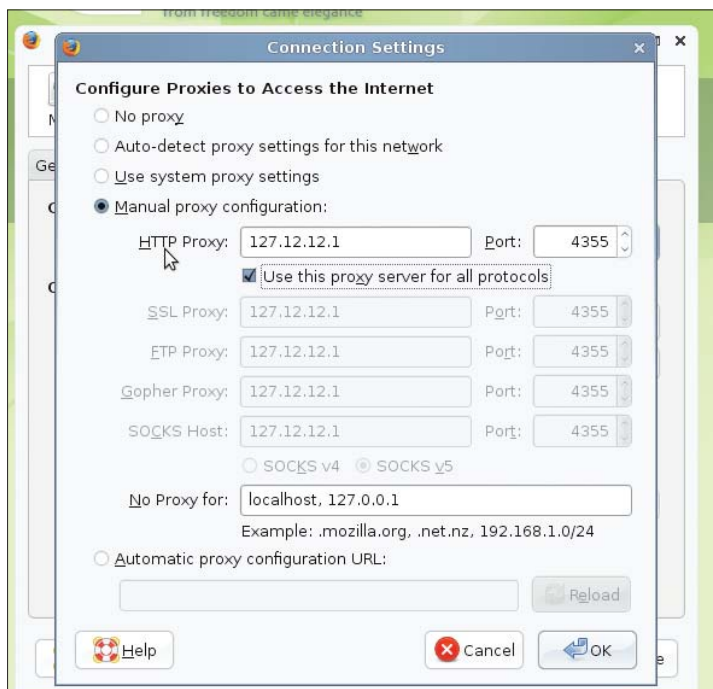
Now start up the connection editor in Linux, and enter this id in the MAC field.



This should let you connect to the Internet with the same machine id as the one used for your main computer.

If Linux is installed in an office environment, or you otherwise use a proxy for connecting to the Internet, you will have to configure the proxy address in your browser before you start surfing.

In Firefox, the proxy can be configured by going to **Edit > Preferences > Advanced > Network > Settings**. Either use auto detect proxy, or manual proxy configuration. Enter the proxy address and the port number. If there is a different proxy for SSL and FTP sites apart from the HTTP proxy, enter these as well. Contact your network administrator for these settings if you do not know them or have them written down. Some companies use a URL for configuration, which can also be entered in this window.



In Opera, the proxy settings can be found in **Tools > Preferences > Advanced > Network > Proxy servers**. You won't have to repeatedly put these settings in, just one browser will do, as the other browser can import the settings

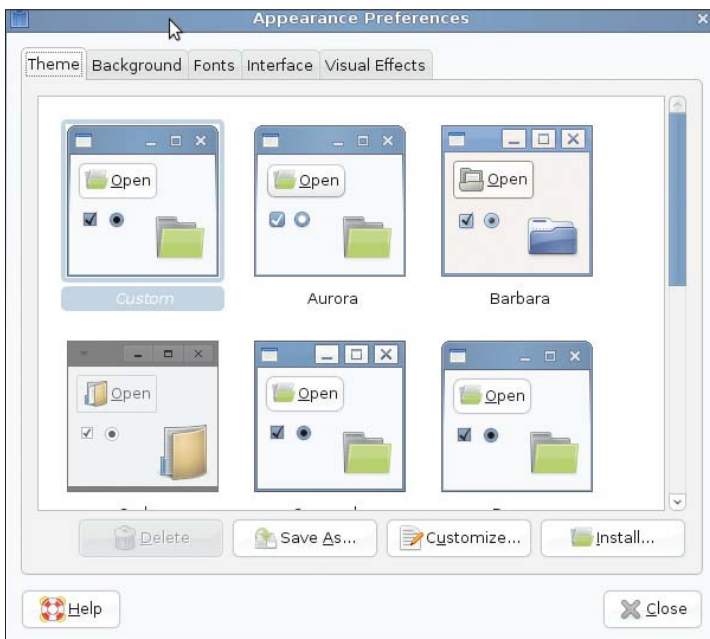
from a configured browser.

These steps should make your computer ready to surf the web.

In some distros, there can be a mysterious problem in connecting to the Internet. Despite the IP address and associated configurations being correct, a connection simply cannot be established. Make sure that the Ipv6 protocol is disabled, a setting change that requires a restart. This problem is particularly noticeable in OpenSUSE.

## 3.2 Customising the theme.

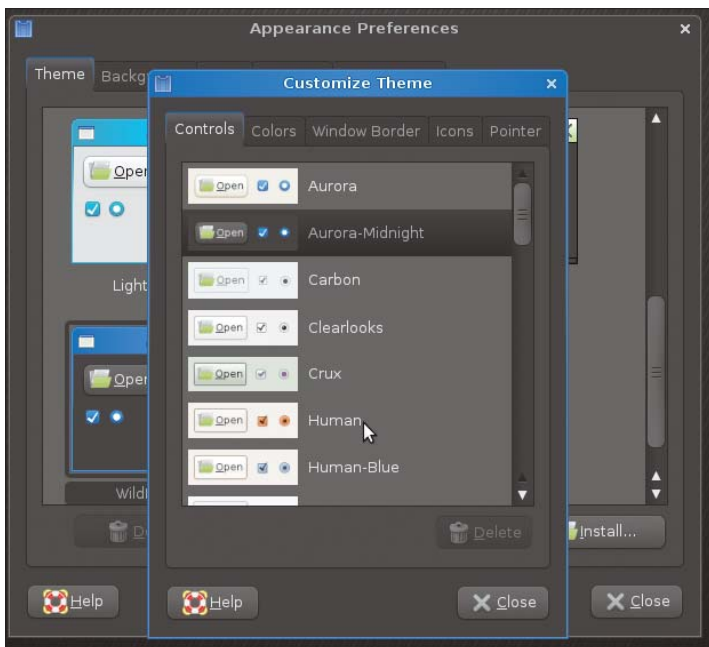
Depending on the Distro and Desktop Environment in use, Linux usually gives a lot of options in terms of themes, colors, icon sets and animations. Since everything is open source, the only thing that is really limiting you is your technical prowess and imagination. There are many icon sets and themes available for download, including scripts that can give a massive makeover to how your system looks. Basic but drastic changes



can be made by the new user, and the options are much more diverse than a Windows OS.

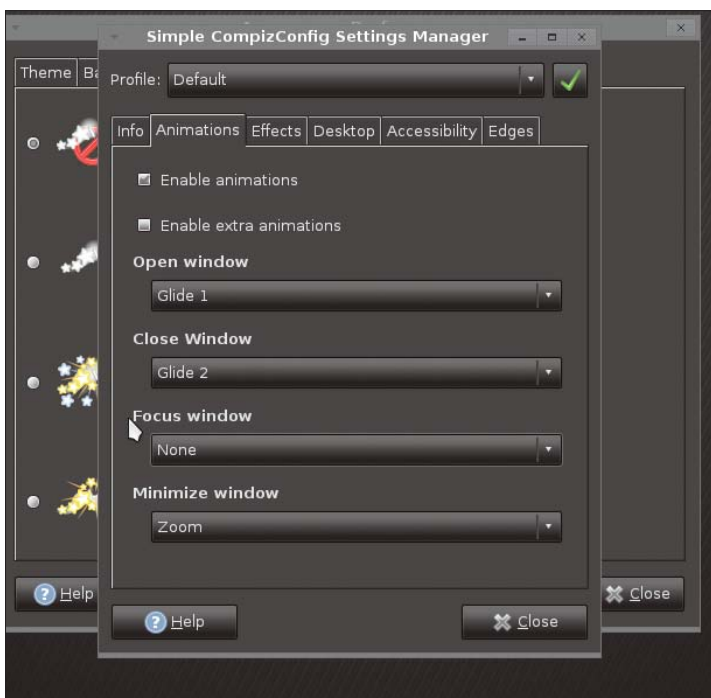
Right click on the desktop, and choose change wallpaper. This brings up the Appearance Preferences. Alternatively, you can search the menu for an equivalent function. Navigate to the theme tab.

The entire desktop changes the second you click on a theme and select it, which is much faster than applying a theme on say XP. Click on Customize to further customise a theme if you don't like any of the preset ones.



This window gives you a choice of controls (fields, radio buttons and check boxes), colors, borders, icon sets and pointers. You can mix and match, and choose colors as per your preferences. Once you think you have got it, click on OK. Choose the Visual Effects tab, and then click on Preferences to change the animations and effects on your desktop. This allows you to set the animations for different actions, like opening, closing, focusing and minimising windows.





You can also choose the number of desktops. These are alternate desktops that you can open different windows on and work. Linux Mint lets you create as many as 81 desktops, but this is seriously inadvisable even if you have 4 GB of RAM.

### 3.3 Customising the Panel

The panel or the start bar, can be customised by simply dragging and dropping the elements around. The Panel in a desktop environment allows you to gain easy access to programs, manage tasks, keep an eye on the date, keep track of running applications, and adjust settings. The panels in all environments in Linux are entirely customisable. KDE allows you to resize the panel by merely dragging the mouse, a feature that unfortunately, GNOME lacks.

Right click on the panel, and click Add to Panel to add elements

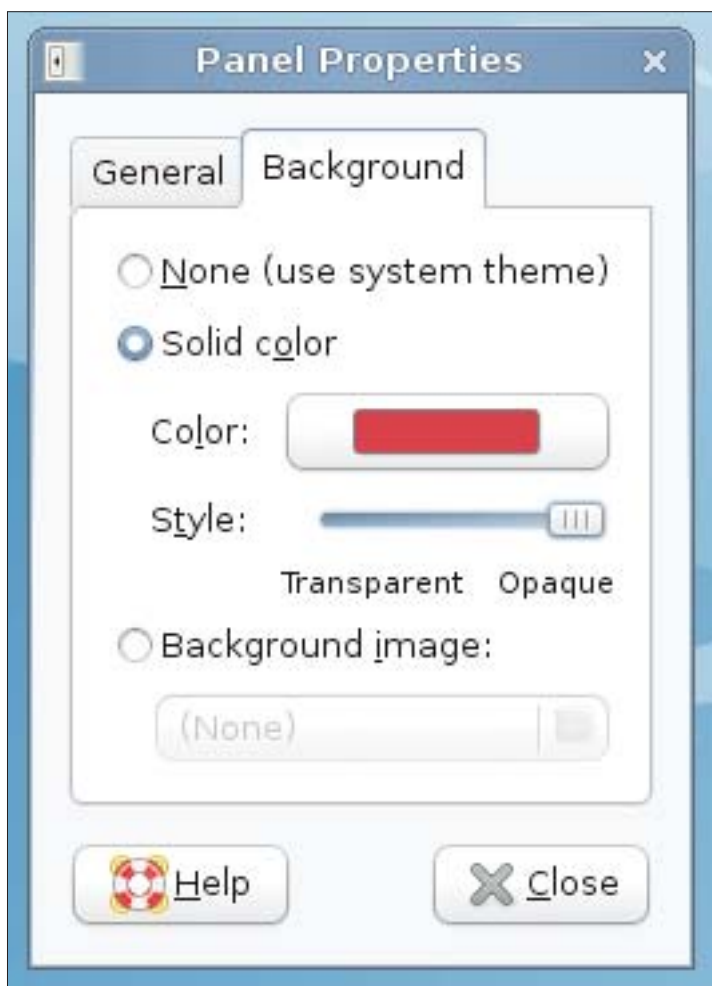
to the panel. Depending on the desktop environment, you will get a long list of elements that the particular desktop environment supports. Click on the elements that you want and select add to add to the panel. Not all panel elements are particularly useful, this includes a set of eyeballs or a virtual pet fish.



To move the panel around, just click on it and drag it to any edge of the screen. This allows you to place the panel on top or bottom of the screen as per your preferences. Right click on the panel and click “New Panel” to create another panel on the desktop. This gives you a blank bar that you can modify.

An important element in the panel is the separator, which can be placed between elements so that they don't spill into one another, and organise the panel. To delete a panel, right click on it and select Delete this panel.

To resize the panel in GNOME, right click on the panel, select properties and enter the preferred size of the panel in pixels. The default is 24, which is usually the height of the panel on the top or bottom edge. From this dialogue, you can set a color for the panel



or choose to use an image. This dialogue also lets you hide the panel when it is not in use.

# The Command Line

## File and navigation

Once in a directory, type in

```
$dir
```

to get a list of all files and folders in the current directory. The output should be like:

```
as.slide  Documents  Music      Pictures  xl\ files
as.txt    Downloads  MyGames    Projects  Zael.jpg
dvd       note.txt   Q3
Desktop   index.html tuxracer-0.61
```

To open a file, click on the entire file name, like

```
$note.txt
```

Optionally, you can also use the command

```
$ls
```

which on some systems highlights the directories by color coding them.

```
$ls -alt | more
```

Gives a list of all directories, sub-directories and files, with detailed information on them.

To go up a level, type

```
$cd ..
```

Note the space between the `cd` and the `..`

To go to a previous directory, type

```
$cd -
```

the name of the previous directory will be printed before the prompt.

To go to the home directory, `/home/username`, type

```
$~
```

or just

```
$cd
```

to change the name of the directory, type

```
$mv originalname newname
```

```
$-d
```

prints the name of the current directory

To find a file or folder, type

```
$locate filename
```

The command line will throw a list of results. If there are too many, use

```
$locate filename | more
```

## Networking and the internet

```
$ping [ip address]
```

or

```
$ping [machineid]
```

will ping the target machine.

```
$netstat
```

gives a list of users on the network and system information

```
$netstat | more
```

the netstat command for crazy haxxor geeks.

```
$route -n
```

shows the ip routing table, with destination, gateway, gen-mask, flags, metric and other details.

To download something from the Internet, type

```
$wget followed by the url
```

for example,

```
$wget http://www.getdeb.net/download/3757/0
```

Linux will download the contents of the link, and print something like:

```
--2009-01-20 09:42:58-- http://www.getdeb.net/  
download/3757/0
```

```
Resolving www.getdeb.net... 94.126.144.44
```

```
Connecting to www.getdeb.net|94.126.144.44|:80...  
connected.
```

```
HTTP request sent, awaiting response... 302 Moved  
Temporarily
```

```

Location:  http://getdeb.agetta.de/ubuntu/intrepid/
id/mi/midori_0.1.1-0~getdeb1_i386.deb [following]
--2009-01-20                                09:42:59--
http://getdeb.agetta.de/ubuntu/intrepid/mi/midori_0
.1.1-0~getdeb1_i386.deb
Resolving getdeb.agetta.de... 85.10.209.172
Connecting                                          to
getdeb.agetta.de|85.10.209.172|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 302416 (295K) [application/x-debian-pack-
age]
Saving to: `midori_0.1.1-0~getdeb1_i386.deb.1'

100% [=====>]
302,416      499K/s   in 0.6s

2009-01-20 09:43:00 (499 KB/s) - `midori_0.1.1-
0~getdeb1_i386.deb.1' saved [302416/302416]

```

## Archive management

To uncompress a downloaded file with the tar.gz extension, type

```
$tar -zxvf file.tar.gz
```

for example

```
$tar -zxvf LiVES-0.9.9.5.tar.gz
```

the terminal will print a long list of directory structures and filenames, where the uncompressed files have been stored.

If you encounter an uncompressed tarball, that you want to unpack, type

```
$tar -xvf file.tar
```

To uncompress a tar.gz file to a tarball, or to uncompress a .gz file, type

```
$gunzip file.gz
```

or

```
$gunzip file.tar.gz
```

For example,

```
$gunzip LiVES-0.9.9.5.tar.gz
```

Note that by default, Linux does not make two copies of the same file when it is compressed or uncompressed. That means that if the above command is executed, the folder will have a `LiVES-0.9.9.5.tar` file, but the `LiVES-0.9.9.5.tar.gz` file will be deleted.

To unpack a `bz2` file, type in  
`$bunzip2 file.bz2`

To unzip a `.zip` file, type in  
`$unzip file.zip`

These commands will unpack the contents into a separate folder with the file name, after subtracting the extensions.

To make a compressed archive out of a directory, type  
`$tar -c directory/ | bzip2 > directory.tar.bz2`

### Sundry commands

To see a list of all available commands:

Go to the command line

press `[Tab]` twice. Beware though, on complex systems, you will get a prompt like:

Display all 3171 possibilities? (y or n)

If you are going to type `y`, it is a good idea to go to `edit>profile preferences>scrolling` and change the scrollbar to 5000 lines or more. Note, the filesize increases, 5000 lines are worth 3.1 MB.

A variation of this command is typing some text and then pressing `[Tab]` twice, which shows all the commands that start with those letters.

For example,

`$ su [Tab] [Tab]`

Which gets the output

<code>su</code>	<code>sudoedit</code>	<code>sum</code>	<code>su-to-root</code>
<code>sudo</code>	<code>sulogin</code>	<code>suspend</code>	

To find out all variations of a command, type in

`$man ls`

which gives an output like:

NAME

ls - list directory contents

#### SYNOPSIS

ls [OPTION]... [FILE]...

#### DESCRIPTION

List information about the FILES (the current directory by default).

Sort entries alphabetically if none of -cftuvSUX nor --sort.

Mandatory arguments to long options are mandatory for short options too.

-a, --all

do not ignore entries starting with .

-A, --almost-all

do not list implied . and ..

--author

with -l, print the author of each file

and so on for a long list of pages.

\$cal month year

like

\$cal 20 2020

gives an output of

December 2020

Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	
6	7	8	9 1	0	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

\$clear

clears the screen



```
$free
```

prints out all the free resources on the computer

```
      total    used      free   shared  buffers  cached
Mem: 1024432 1008688  15744 0        12012   245732
-/+ buffers/cache:  750944  273488
Swap:      2996080  14920 2981160
```

```
$shutdown 10
```

shuts down the system after ten minutes

```
$shutdown -r 10
```

shuts down the system after ten minutes then restarts

```
$command help
```

shows help for the particular command

eg:

```
$ip help
```

To access a simplistic, notepad like text editor, type

```
$xedit
```

To access a browsable command line reference manual, type

```
$xman
```

# Installing software

## 5.1 One-click installation

Most of the common distributions have a large index of popular programs on the distribution specific web sites. Most software work on one-click installations from other web sites as well. For example, as a user of Interpid Ibex, you can install software from the one click installation index in the Linux Mint Felicia portal. One-click installation is the most common method for installation in SuSE, one of the more common rpm-based distributions.

Here, we show you how to install packages from a one-click installation for Linux Mint Felicia. The procedure is similar for one-click installations on other distributions, where available, like Open SuSE. Note that a configured Internet connection is essential for one-click installations, but most Linux programs have a large file size, so most of them are manageable even on a slow connection.

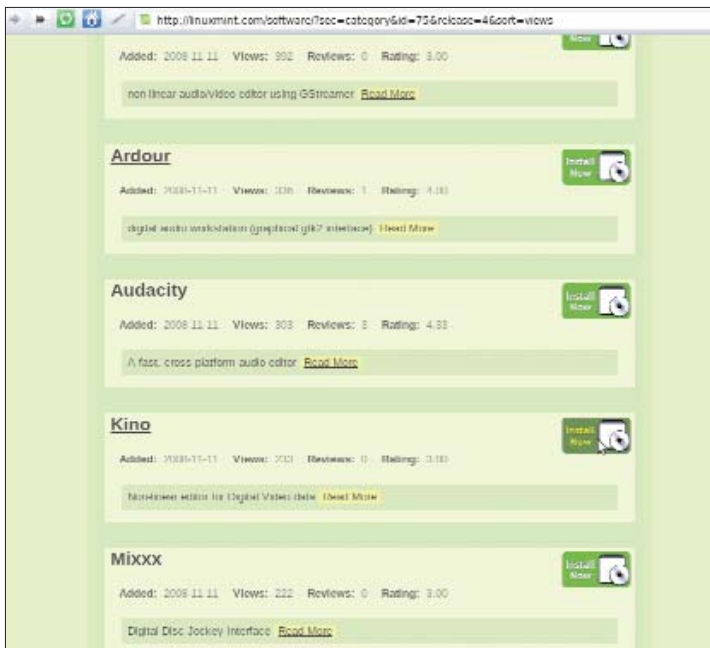
For Linux Mint Felicia, go to <http://linuxmint.com/software/>

Select Felicia in this menu, which is a list of all Mint versions. The next page is a breakdown of the categories in which software for Felicia is indexed and available as a one-click installation.

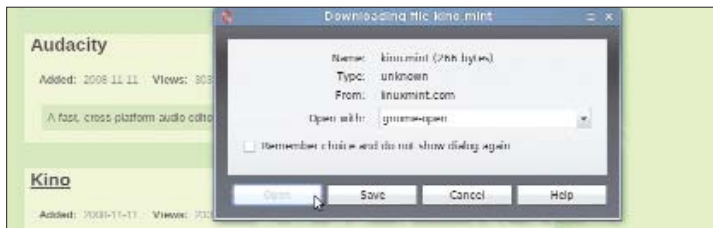


The software listed in a sub category, is also listed in the main category. This means that software listed in Sound and Video > Burning Tools, will not be listed in Sound and Video along with other software listed in the Audio Player and Video Player categories.

Once you have homed in on software you want to install, click on the “install now” icon.



Given a choice of saving and opening, select open. This feature works differently in different browsers, depending on how the web



browser handles downloads. In Firefox or Konqueror, you will be asked to enter the password directly. In Opera, you will have to click on Open, agree to use Gnome-open to handle the file, and then enter the root password.

A message will pop up giving an overview of the changes the installation will make on your system. This is common across most distributions, where a description of the software, the packages being downloaded, and what repositories are being used are shown. Sometimes, MintInstall can use the Ubuntu repositories for installing software on Mint. Many distributions are compatible with the repositories of the distributions they are derived from. If you are sure that this is the software you want, and you are prepared to install it, click on install.



Now the MintInstall program will start working, and start downloading the necessary packages and dependencies necessary to install the program on your operating system. First the dependencies are installed, and then the packages of the program itself are installed. The number of dependencies you need to download will decrease drastically for the first few installations, and then level out. This happens as more common libraries are shared by a lot of software.

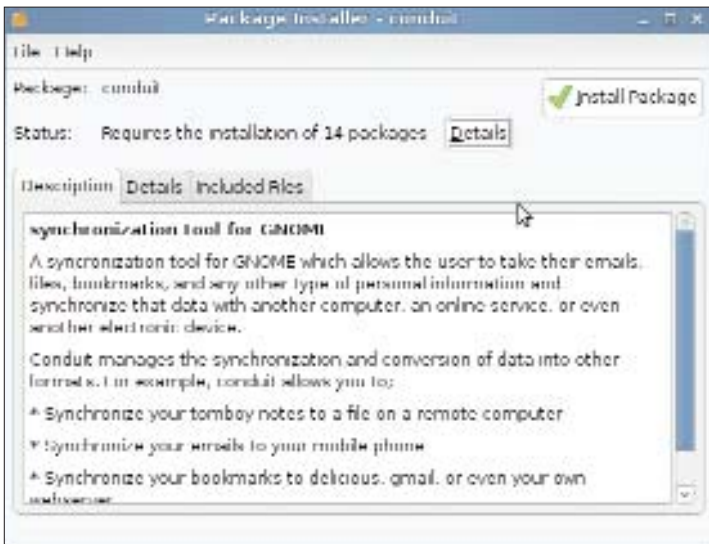
The installation is now complete. Click on close, and start up the program that you just installed. It will show up in the relevant section of the menu. In this case, under Sound and Video.



This is the easiest way of installing software on Linux. Installing from an rpm or deb package might have a problem of unsupported or outdated repositories, or a problem of dependencies. When available, look for a one-click installation, if you are a beginner. If the software you want is not available, look for an alternative that will do the same job.

## 5.2 Installing from packages (.rpm or .deb)

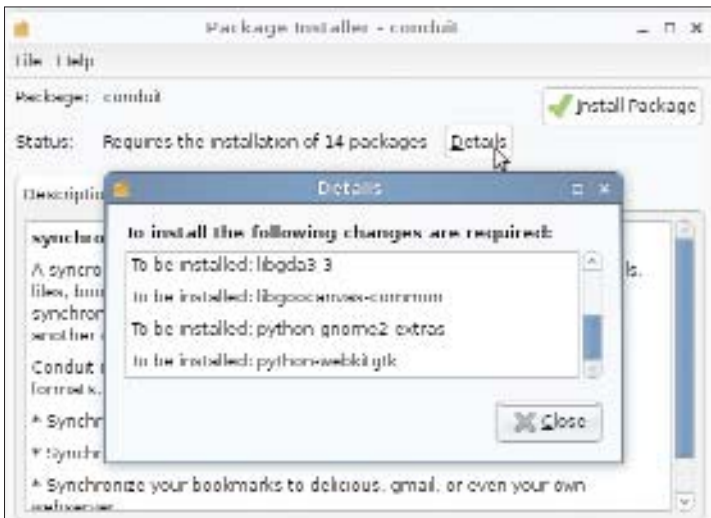
RPM and DEB are to Linux what executables are to Windows. RPM stands for Red Hat Package Manager, and DEB stands for Debian. Debian is a combination of Debrah and Ian — Ian Murdock being the founder of Debian, and Debrah his girl friend. SuSE and Red Hat were some of the earliest flavours of Linux distributions. Debian also shares the same distinction. Most of the distributions that we see nowadays have their origin from one of these distributions. SuSE itself is derived from Slackware. Mandrake (now Mandriva) and Fedora are both derived from Red Hat. Ubuntu and Knoppix are both derived from Debian, and Linux Mint is derived from Ubuntu. There are some original releases, like dyne:bolic and puppy linux. By and



large, a Linux distribution will work with either RPM packages or DEB packages.

DEB files are available on [www.getdeb.net](http://www.getdeb.net) and RPM files are available on <http://sourceforge.net>. <http://rpm.pbone.net/> is another site for RPM downloads, particularly useful for downloading libraries and dependencies. It is an RPM search engine. Once the packages are downloaded to a relevant folder, all you need to do is double-click to install. If another version of the software is listed in the repository of the distribution, then a prompt will show up.

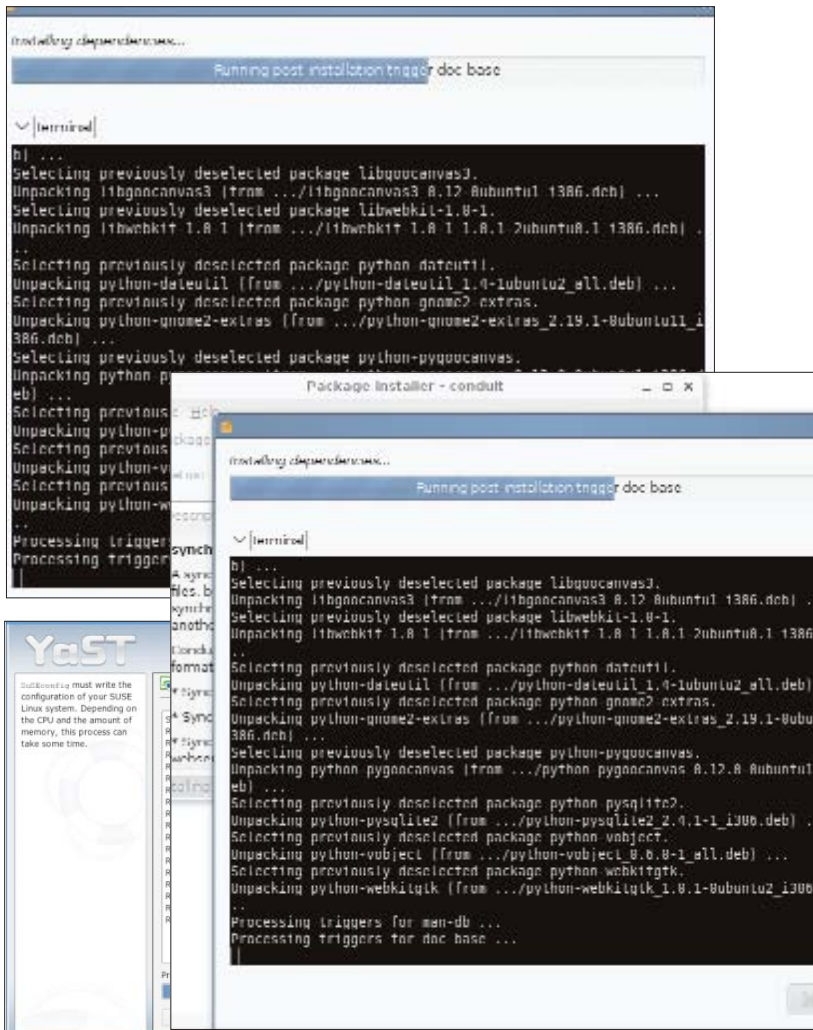
Usually, the distribution will have been tested with the version of the software listed in the repository. In most cases, it works fine to use the version you have downloaded. In some distros, the installer does not manage the dependencies as effectively as it's done in other versions.



In Linux Mint, the dependencies are listed. These will be downloaded and installed along with the contents of the package you have already downloaded. If you're facing problems with dependencies in an RPM-based distro, a software called 'yum' is better at resolving dependencies as compared to YaST. If the necessary dependencies are not there in the system, and the installer does not automatically install the dependencies, you will be given a list of

missing libraries. Consider this as the missing DLL file problem in Windows, and download and install the missing libraries manually.

If the installer resolves the dependencies automatically, first the libraries are installed, and then the data from the package is used to install the program.





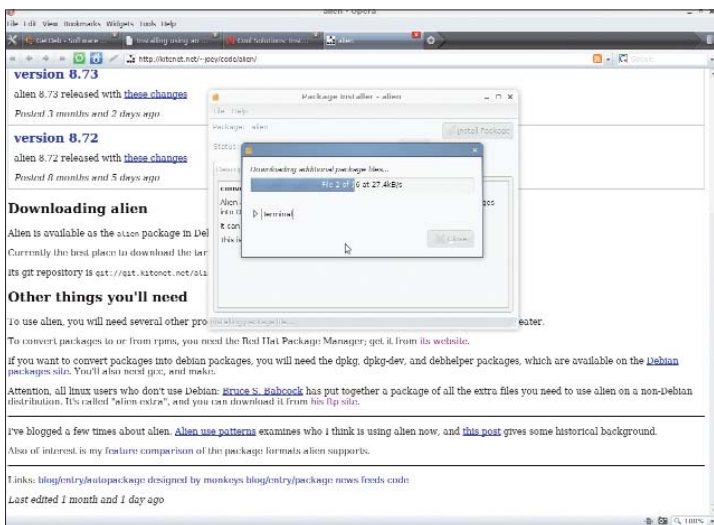
The procedure is more or less similar for RPM-based distributions where dependencies are not a problem.

If you have an RPM or DEB package for a particular program, but your distribution is not compatible with RPM or DEB files, there are a number of ways to install the program onto your machine despite this. Deb packages use tarballs as a component of their packaging. Extracting these tarballs from the packaging is a relatively easy process. Open the terminal, and type

```
$ ar -x package.deb
```

The process for installing RPM packages on debian-based distributions is not as simple as that, and requires a little more effort. One common program that people use is called Alien. The software is available for download at <http://tinyurl.com/alienlin>.

Although unstable, and may not work well with all the packages, but is the most probable solution. You will also need to download the RPM package manager for converting to and from RPM,



which is available at <http://www.rpm.org>. An easier method is to go out and find a source tarball for the same software.

Use the package manager to install Alien.

Alien has an unusually long list of dependencies that need to be resolved. Installing Alien on an RPM-based distribution is

tougher than installing Alien on a deb-based distribution, but Alien works better on an RPM-based distribution because of the way deb files are made. For those downloading Alien on an RPM-based distribution, <http://tinyurl.com/alienextras> has all the necessary extra packages required to run Alien.

Once installed, Alien will not show up in the menu. Don't worry about this, you will come across a lot of Linux programs like this. This does not mean that there was anything wrong with the installation procedure. This just means that you will have to run the program from the command line. Open the terminal in the folder where you downloaded the RPM package.

Type in

```
$ sudo alien package.rpm
```

In this case, the package name was `darcnes-9b0401-2.3.i586.rpm`

So, in the command line,

```
~/Downloads $ sudo alien darcnes-9b0401-2.3.i586.rpm
```

The terminal will prompt for a password

```
[sudo] password for user:
```

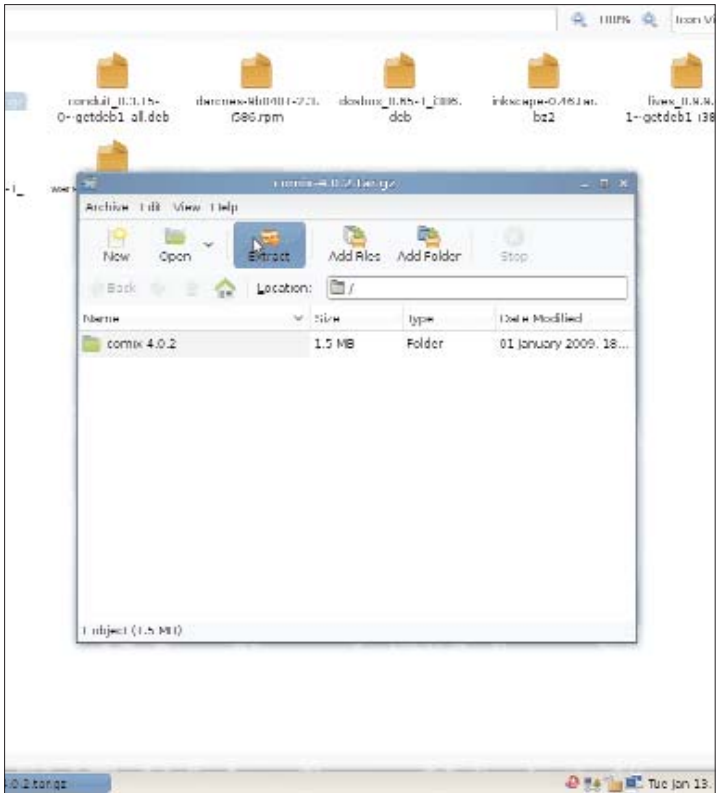
Enter the password here. The password will not show up on the screen. The DEB package should be in the same folder if all goes well.

## 5.3 Installing from source tarballs

---

Installing from tarballs is the next best method for installation after the one-click installation. Source tarballs are the most common method of distribution for open source software. This ensures that they work across platforms, across distributions and in many cases are compiled for the specific hardware present on the system. This also makes sure that the software is configured for you as an individual user, and your preferences.

The 'ar' in the 'tar' stands for archive. The 't' comes from tape. The name tarball is a hangover from the times when tapes were used to archive data from computers. When distributed, the tarball is compressed into a format to reduce the file size. This is usually `tar.gz` or `tar.bz2`. The difference between the two is merely different agents of compression, and all Linux distros can handle either format with ease.



Once you have downloaded a tarball, you can unpack it using the archive manager. This step is similar to unzipping a file. Double-click or right-click and select open with archive manager.

The contents will be extracted to the destination folder. To do the same step in the command line, type in

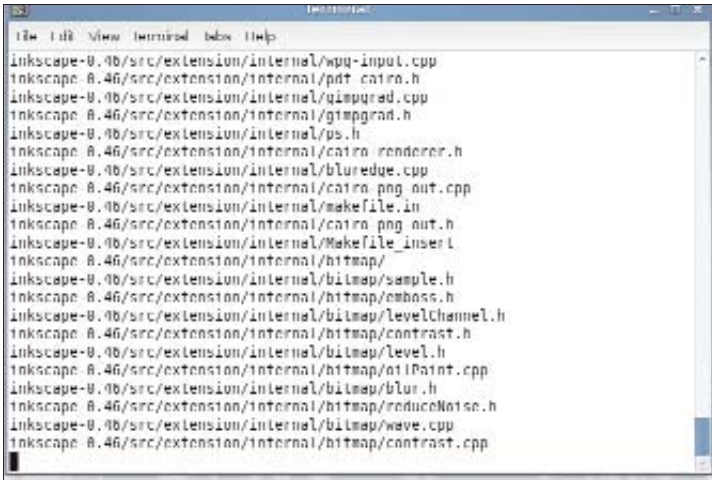
```
$ tar xzf comix-4.0.2.tar.gz
```

You don't need the root password for this step. For the next step, navigate to the folder where you unpacked the package to, open the terminal or type in

```
$ cd comix-4.0.2
```

That is, 'cd' followed by the directory name where the package was unpacked to. Now go through the 'readme' file. The readme file will have specific command line instructions about how to

install the software. For example, this software requires you to enter `$ python install.py --dir /usr install`, in the



```

Inkscape-0.96/src/extension/internal/wpp-input.cpp
Inkscape-0.46/src/extension/internal/pdf-cairo.h
Inkscape-0.96/src/extension/internal/qimgread.cpp
Inkscape-0.46/src/extension/internal/gimpgrad.h
Inkscape-0.96/src/extension/internal/ps.h
Inkscape-0.46/src/extension/internal/cairo-renderer.h
Inkscape-0.96/src/extension/internal/blurredge.cpp
Inkscape-0.46/src/extension/internal/cairo-png-out.cpp
Inkscape-0.96/src/extension/internal/makefile.in
Inkscape-0.46/src/extension/internal/cairo-png-out.h
Inkscape-0.96/src/extension/internal/Makefile.in
Inkscape-0.46/src/extension/internal/bitmap/
Inkscape-0.96/src/extension/internal/bitmap/sample.h
Inkscape-0.46/src/extension/internal/bitmap/emboss.h
Inkscape-0.96/src/extension/internal/bitmap/levelchannel.h
Inkscape-0.46/src/extension/internal/bitmap/contrast.h
Inkscape-0.96/src/extension/internal/bitmap/level.h
Inkscape-0.46/src/extension/internal/bitmap/at1Paint.cpp
Inkscape-0.96/src/extension/internal/bitmap/blur.h
Inkscape-0.46/src/extension/internal/bitmap/reduceNoise.h
Inkscape-0.96/src/extension/internal/bitmap/wave.cpp
Inkscape-0.46/src/extension/internal/bitmap/contrast.cpp

```

command line. There may be other options available depending on the software you are installing. While unpacking into a folder, the terminal may show rows of what appear to be random text like

This is the list of files being unpacked. Be patient while this happens.

The next step is to configure the installation. This can be done by going to the folder of the unpacked files in the terminal and typing

```
$ ./configure
```

The terminal will check the files against the system and throw a long list of checks like:

```

checking build system type... i686-pc-linux-gnu
checking host system type... i686-pc-linux-gnu
checking for a BSD-compatible install...
/usr/bin/install -c checking whether build environ-
ment is sane... yes checking for a thread-safe mkdir
-p... /bin/mkdir -p checking for gawk... no
and so on...

```

You need not worry about all of this. Just scan the text for errors. In this installation of Inkscape, a vector graphics editor, there is one error.

configure: error: libpng >= 1.2 is needed to compile inkscape

You need to install libpng to compile and run inkscape. Download the required files online and type in `./configure` again after doing this. If there are no errors, type:

```
$ make
and then
$ make install
```

This will compile, then install the program onto the operating system. This part is a fairly time consuming process, more so on slower machines.

## 5.4 Command line installation

It is possible to download, unpack and install from the command line itself. The command to download a software is `wget` followed by the URL of the package. To download and install Tux Racer, for



```

You are dishonest, but never to the
point of hurting a friend.

[~]
[ Y ]
[!~!]
[~]

mityajadi@tya-desktop ~$ wget http://downloads.sourceforge.net/tuxracer/tuxracer-0.61.tar.gz?modtime=980899280&big_mirror=0
11 12049
mityajadi@tya-desktop ~$ . 2009-01-13 05:48:14 -- http://downloads.sourceforge.net/tuxracer/tuxracer-0.61.tar.gz?modtime=980899280
Resolving downloads.sourceforge.net... 210.34.101.80
Connecting to downloads.sourceforge.net[210.34.101.80]:80... connected.
HTTP request sent, awaiting response... 302 Moved temporarily
Location: http://ncic.dl.sourceforge.net/sourceforge/tuxracer/tuxracer-0.61.tar.gz [following]
--2009-01-13 05:48:15-- http://ncic.dl.sourceforge.net/sourceforge/tuxracer/tuxracer-0.61.tar.gz
Resolving ncic.dl.sourceforge.net... 211.79.68.17
Connecting to ncic.dl.sourceforge.net[211.79.68.17]:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 63020 (62K) [application/x-gzip]
Saving to: 'tuxracer-0.61.tar.gz'

98% |-----> 255,211 14
  
```

example, type:

```
$ wget http://downloads.sourceforge.net/tuxracer/tuxracer-0.61.tar.gz?modtime=980899200&big_mirror=0
```

Once the download is complete, press [Enter] again. Now type:

```
$ tar xvf tuxracer-0.61.tar.gz, and continue installing
with the ./configure, make, and make install commands.
To install from an RPM package, type:
```

```
$ rpm -ivh packagename.rpm
for a debian package, type:
$ dpkg -i packagename.deb
```

The command line appear as follows:

```
Preparing...##### [100%]
1:packagename##### [100%]
This means that the package has been installed properly.
```

Another easy way to install is to use the apt-get command for debian-based distributions. In the command line, type:

```
$ sudo apt-get install packagename
```

So, for example, if you want to install a game called pingus, type:

```
$ sudo apt-get install pingus
```

The response should appear as follows:

```
Reading package lists... Done Building dependency
tree Reading state information... Done The following
extra packages will be installed: libboost-sig-
nals1.34.1 libsdl-image1.2 libsdl-mixer1.2 pingus-
data The following NEW packages will be installed:
libboost-signals1.34.1 libsdl-image1.2 libsdl-
mixer1.2 pingus pingus-data 0 upgraded, 5 newly
installed, 0 to remove and 212 not upgraded. Need to
get 12.4MB of archives. After this operation, 23.9MB
of additional disk space will be used. Do you want
to continue [Y/N]?
```

Notice that the dependencies are being resolved in the command line. Type in Y and press [Enter]. The command line will show a list of packages and how much time is left.

```
7% [4 pingus-data 763299/11.3MB 6%]
43.6kB/s 4min21s
```

Assuming you have yum installed, the apt-get equivalent for SuSE is

```
$ yum install packagename. If you do not, then please
install it as handling the dependencies will be troublesome other-
wise.
```

To make sure that the apt-get command is working at all times, make sure that the repositories on the system are always updated. To do this, in the command line type:

```
$ sudo apt-get update
```

**Note:** If the programs don't appear in the menu after installation for any of the other methods, the programs will be located in one of the two bin folders on your file system. This is either /usr/bin, or /usr/local/bin.

# Working with images

## 6.1 Transfer images from a camera

---

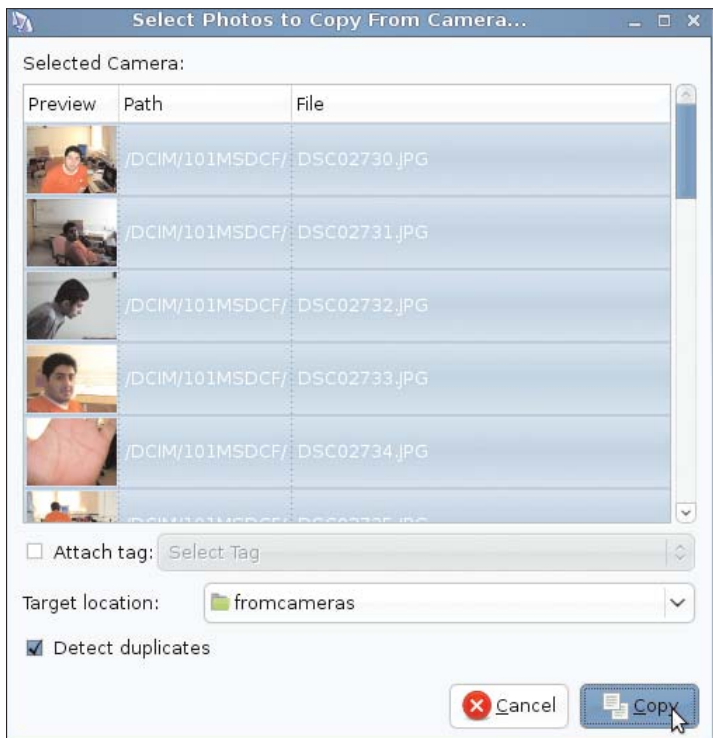
Most Linux distros recognise digital cameras as external memory. They also recognise memory card readers, and slots within the machine for memory cards. You can always navigate through the system explorer to the external storage and select the images, copy them and paste them into a folder of your choice.

Like Windows, the mature distributions go a step further, and display a pop up if you connect a digital camera with photos inside it. There are different programs that come with different distros that recognise the image content in the camera. For most distros



that use gimp, this software is f-spot. You can use f-spot to transfer, tag, manage and edit photos. When you connect a camera to the computer, this screen comes up.

Click OK. You will be asked to choose a partition to mount. Don't get confused by this, just choose the longer of the two displayed file addresses. This is because most cameras store the images in a folder such as DCIM. Now F-spot can either mount the entire camera memory, or just the part with the images inside them.



A list of images on the camera should show up. Select copy, and choose a folder to copy the images to. Using a separate directory every time you transfer images from the camera makes sense. Transferring images from a camera can be that easy.

Another way to import photos using `fspot` is, starting up the program, selecting import, choosing a camera from the list of detected cameras and choosing a folder to import the images into.

To do this from the command line, type:

```
$ cd /media/disk
```

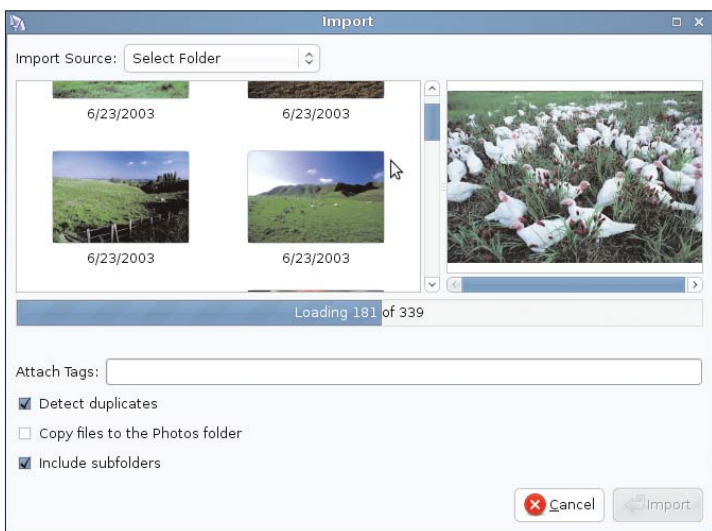
`/media/disk` is by default the address where a camera is mounted as long as there are no other USB drives, external memory or devices connected to the computer. If there are, the disk will be followed by the relevant number. Now use the `dir` command to find out the directory in which the images are stored. Assuming it is `DCIM`, type: `$cp -R DCIM ~/Photos`



## 6.2 Organise images with F-Spot

F-Spot is a great program for keeping track of a large number of images. F-Spot offers advanced tracking features with the use of tags and categories. To start off, import photos into F-Spot from a location on your hard disk. Normally, F-Spot will be in the Graphics submenu in the main menu.

Click on import, select the folder in which the photos are stored. If there are a number of sub folders, make sure that Include Subfolders is checked. Also uncheck Copy files to the Photos folder. The Photos folder is the internal folder used by F-Spot for storing images. Checking this will create a copy of all your images, and take longer to import into F-Spot.

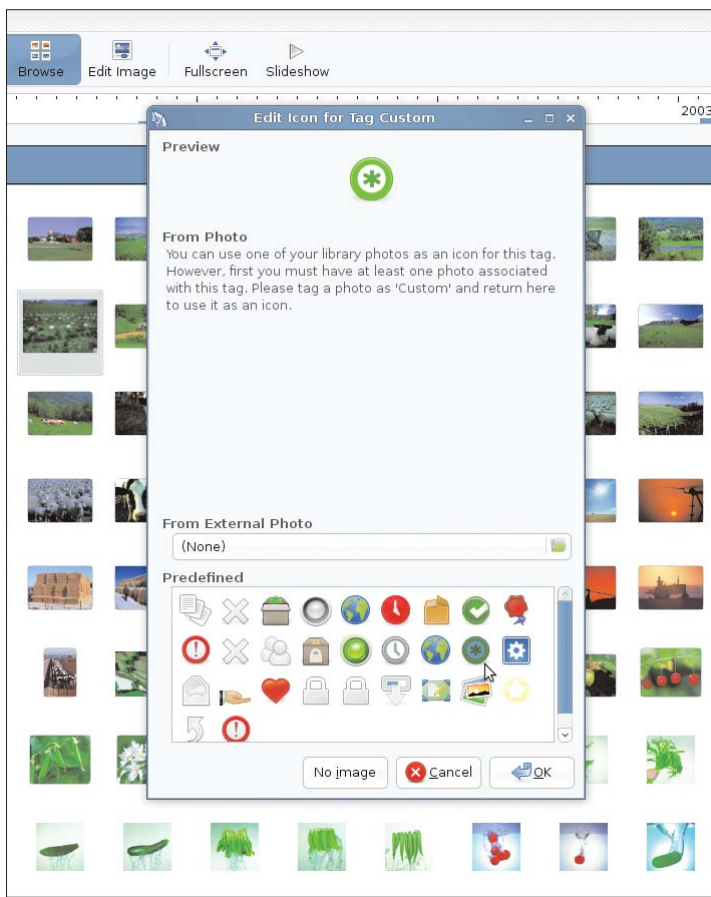


You can tag the photos when you are importing them. To properly organise the photos, make sure there is a date tag, a year tag, a tag for the occasion, and a description. Separate tags with commas. Additionally, tag individual images with the colour temperature, the orientation, the camera with which it was taken and any other descriptive tags that are relevant.

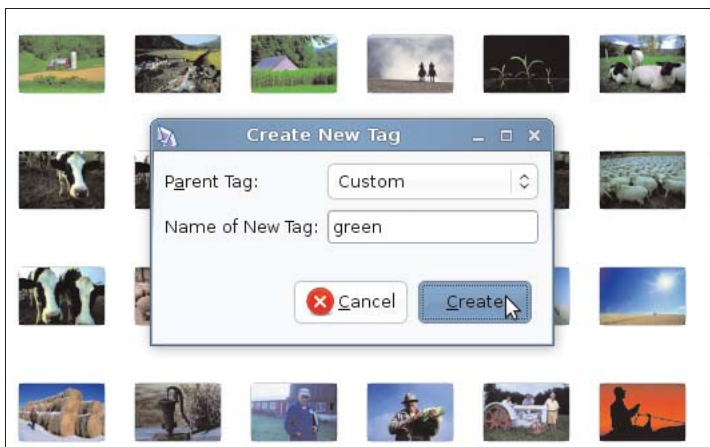
The next step is to tag and rate the photos. You can perform either of these operations on a number of photos at once. If the tag sidebar does not appear by default, go to View > Components >

Sidebar or just use the F9 key. If the sidebar still does not appear (this happens sometimes), select the right edge of the window and drag it towards the centre of the window.

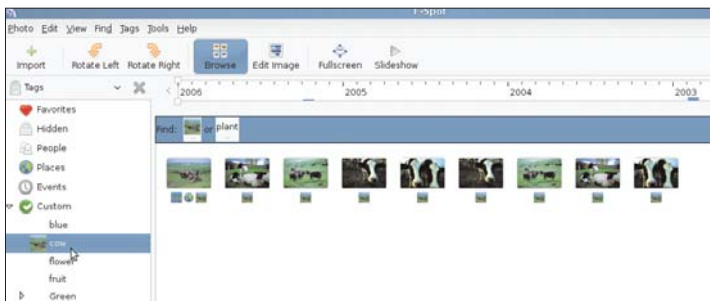
The sidebar should now appear. To start with, create a new tag called 'custom'. Right-click in the tags side bar, and select 'create new tag'. Here, although the tag is created, it does not have an icon. You can assign an icon, by right-clicking on the custom tag, and selecting the blank icon, and choosing a new icon from the list. You can add custom icons by importing PNG files.



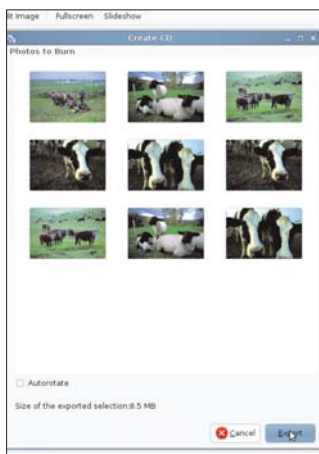
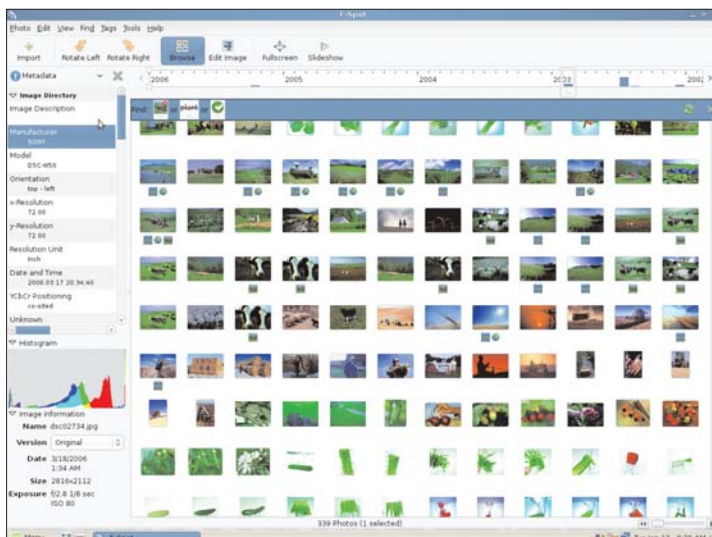
You can create new tags. Right-click on the tag menu and select a new tag. Enter the text and choose 'custom' as the parent tag.



You can have as many parent tags as you want, and child and sibling tags. The hierarchy of the tags can be complex, but a good way is to have a few tags in the first level, and increasing them in subsequent levels. Note that if you do not add icons to the tags, the first image you tag with a particular tag becomes the icon for that tag. You can select a bunch of photos, right-click on them and then tag them with a tag of your choice. You can also rate pictures on a scale of one to five. To browse by tags, double-click the tag and all tagged photos will line up. The more tags you click in succession, the smaller the results get.



F-Spot can also let you analyse the metadata for individual photos. This is not restricted to just the EXIF data stored with the image, but the directory structure and the extended EXIF information as well. To access the metadata viewer, click on the tags menu and select metadata.



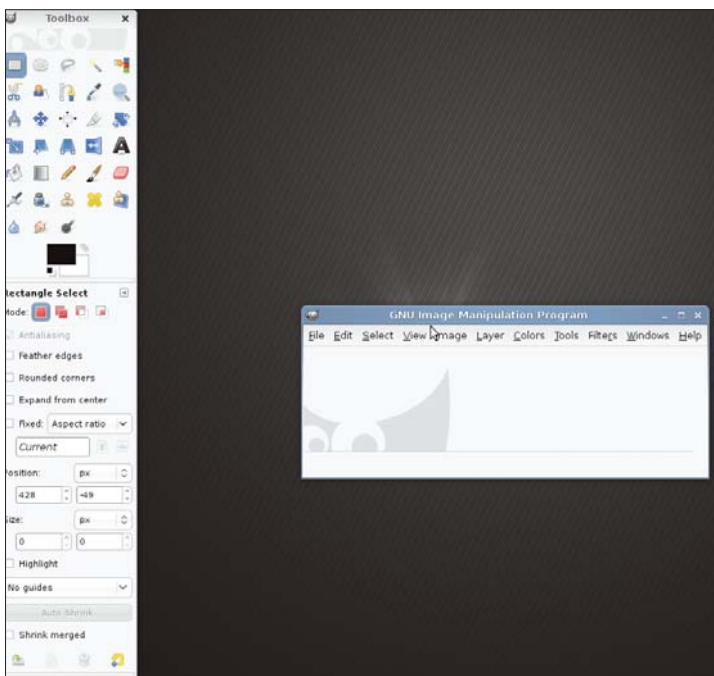
Click on the slideshow option to display a slideshow of all the photos in the current search. To search photos by different parameters, go to the find menu. There are options to search by date, rating and tags. Unfortunately, there is no way to search by metadata, which would have been a really useful feature in a program like this. The export feature is powerful, and can upload selected photos to a number of web services like Picasa, Flickr and Smugmug. It can also burn a CD full of the

selected photos.

First, select the photos you want to perform the export operation on. Then go to Photos > Export to > and then select an option from the list.

## 6.3 Edit images on Gimp

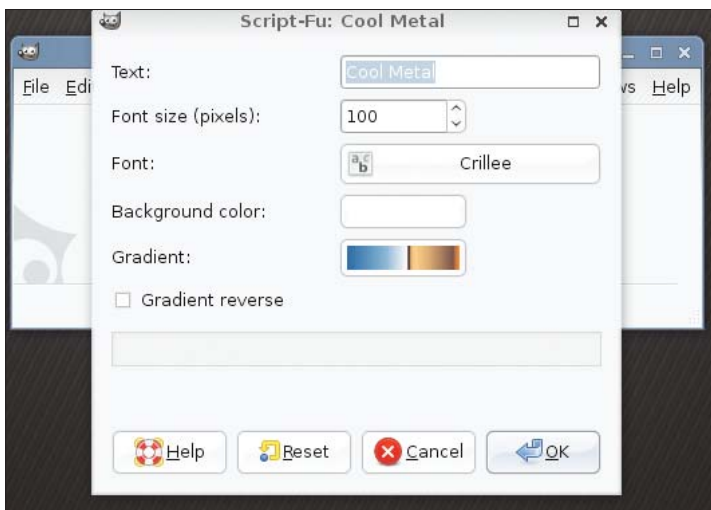
Gimp is the Linux alternative for Photoshop. However, it's nowhere close to Photoshop, but still does a lot of things that are simpler to understand and operate on for the lay user. Gimp is now a standard issue with most distros. Photoshop works perfectly fine with Wine, if you absolutely must use it.



You would notice three different applications are registered on the task bar. This is because the main application, the toolbox and

the layers, channels and patterns window are independent applications although they all work together. In this aspect, the Gimp is totally unique from other image manipulation software.

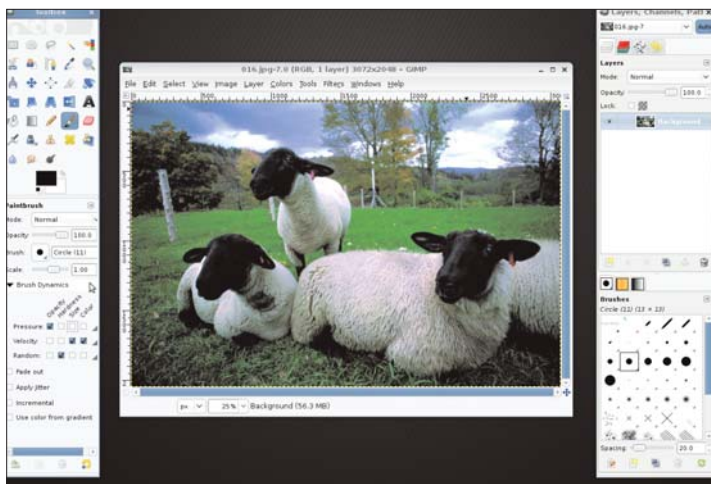
Gimp makes it easy for everyone to jump right in. Go to File > Create to get a jumpstart on common photo editing activities. This includes buttons, logos and web page templates, all with tweakable presets.



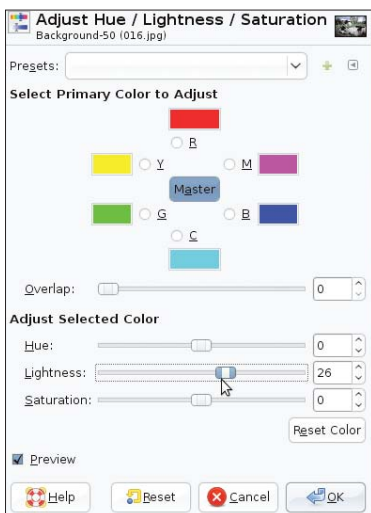
In four clicks, a logo complete with layer effects, transparencies and gradients is ready, which would have taken much longer in Photoshop.

The toolbox of Gimp is organised in an intuitive and uncomplicated way. All the tools available are in front of you from the start, with no hidden tools in tool sub-menus. There is a lot possible with each tool and the interface to tweak shows up in the bottom half of the toolbox when you select a particular tool. Look at the wealth of options available for the brush. Such options are available for all the tools.

Hover around any tool to get a concise description of what the tool does. The right side of the screen is divided into two panels. The top panel has layers, channels, paths and the change history in tabs. The bottom half has brushes, patterns and gradients where relevant.



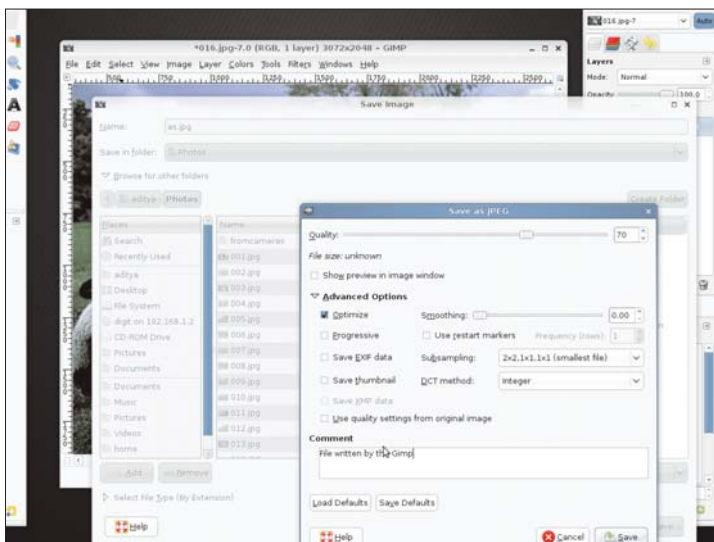
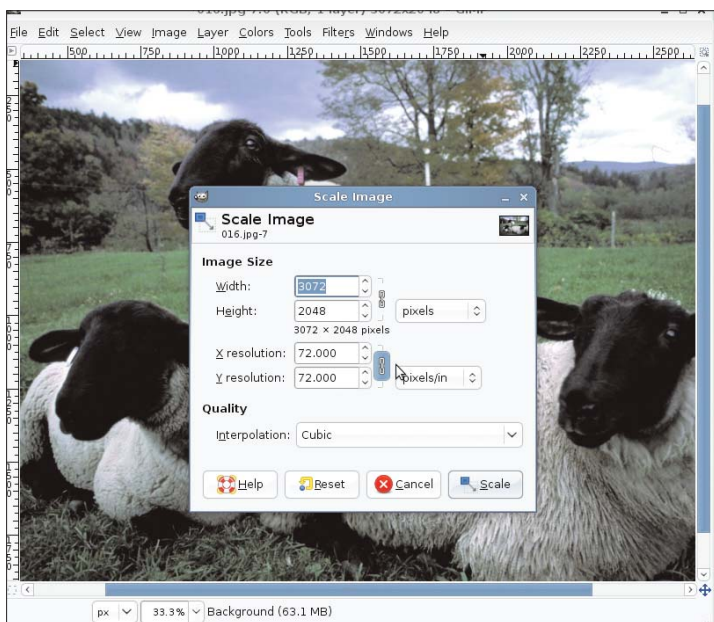
A much wider selection of filters than Photoshop are available with Gimp. The filters are located in their own menu, and even something like the render menu includes fractals and a spirographer. Most of the filters are community-made python scripts, and a lot more are available online.



The hue/saturation and brightness/contrast options are available in the colors menu. There are sliders for tweaking all effects, along with a numerical value.

To crop an image, go to Tools > Transform Tools > Crop. Or just use the shortcut key [Shift] + [C]. Select the area of the image you want cropped, and click OK. To resize an image, go to image > scale image and enter a different dimension in any one of the fields. The other dimensions will change automatically by default.





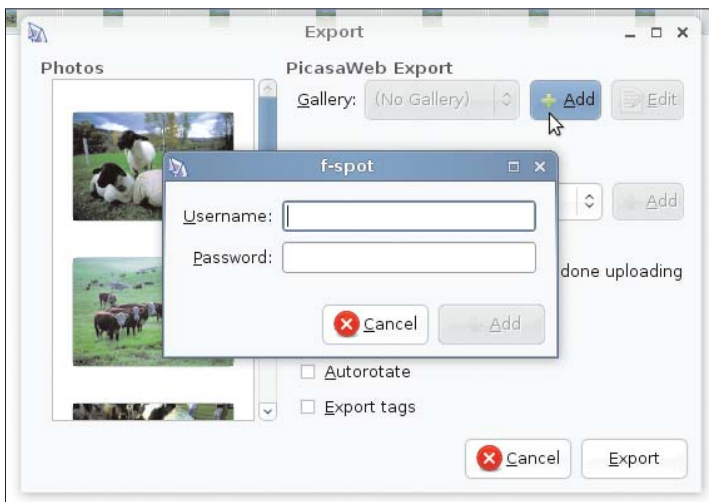


To save an image for the web, first resize the image, then go to **file > save as**. Enter a file name, and reduce the quality using the quality slider.

These are some of the basic operations you can perform with Gimp. There are many good Gimp tutorials online. For more advanced uses, <http://www.gimp.org/tutorials/> is a good place to start. Happy Gimping.

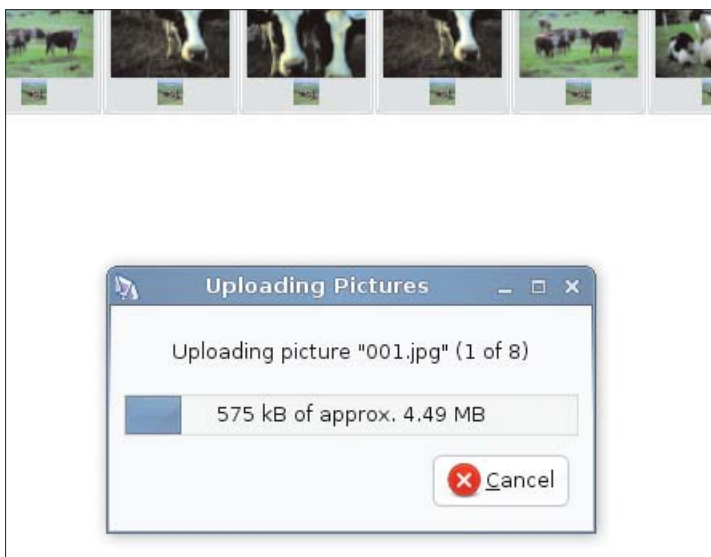
## 6.4 Upload images to Picasa

You can use F-Spot to upload images to Picasa. Select the photos you want to export, go to **Photo > Export to > PicasaWeb**. In the gallery field, click **Add**. This is the username. Enter your username and password at this point.



Next, select an album from the list. If you want to add a new album, click on **Add**, and enter the album name and a description. Also check whether or not you want the album to be public. Then click on **Export**, and the images will be uploaded to the album.

If you do not want to use F-Spot, and are more comfortable with Picasa itself, you can install it on your distribution. Usually, Picasa is available in the repositories of your distro, and the `apt-get` or `wget` commands should work with Picasa. Optionally, you can



also use the package manager or the add/remove software interface to install it. Go to <http://picasa.google.com/linux> to get the latest version of Picasa for your distro (Picasa 3 beta). Use this method if you are using an old distro with an outdated repository.

Note that this version of Picasa for Linux is bundled with Wine and the Gecko engine. This will work the same with Picasa run through Wine.

When you run Picasa for the first time, it asks you if you want it to make your default photo manager. This means that Picasa will detect and handle photos from a camera whenever it is connected instead of F-Spot. This choice depends totally on which software you are more comfortable using. Since Picasa on Linux works through Wine, some of the interface will look like the Windows interface. As soon as it starts for the first time, Picasa will automatically add all the images on your computer to its internal reference.

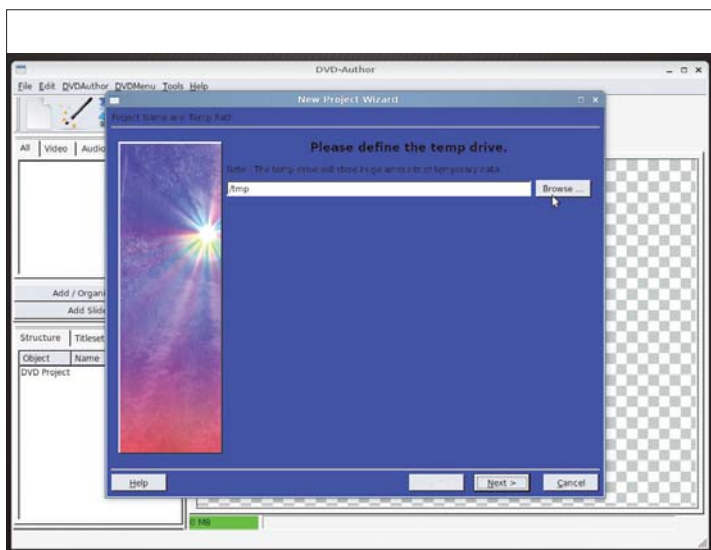
Once all the photos are indexed, right-click on a selection or a folder, and select upload to Web Albums. You will be asked to sign in, enter your Google/Picasa username and password here. Select the details and click on Upload.



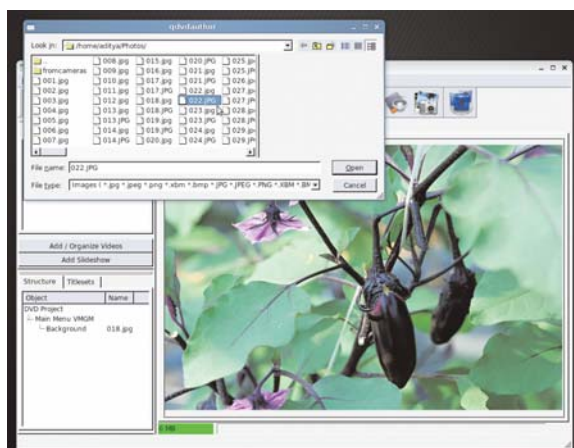
Using Picasa is a lot slower than F-Stop for uploading to the web, but F-Stop has no way of resizing the pictures before they are uploaded. So if you want to conserve space on your Picasa account, it is best to use Picasa for uploading the photographs.

## 6.5 Make a multimedia slideshow with QDVDAuthor

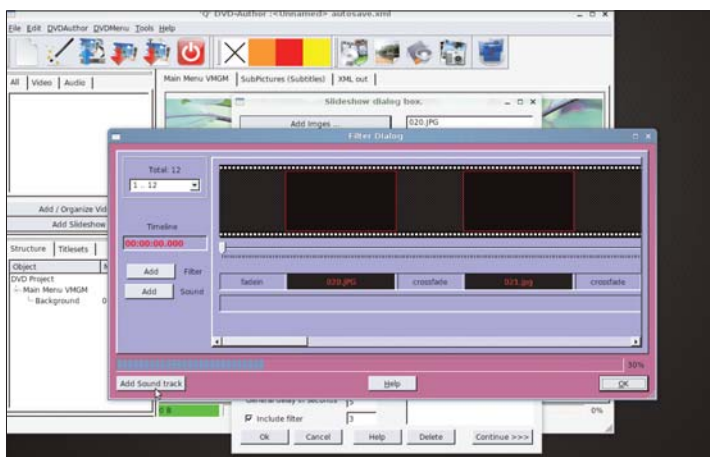
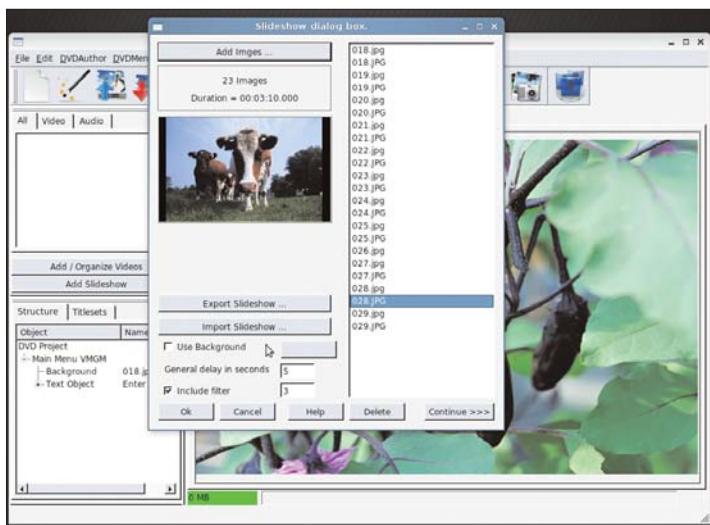
QDVDAuthor is a small program that allows you to burn video and photo slideshows and burn them on a DVD. Use the package manager, the add/remove software interface or the `sudo apt-get` commands to install QDVDAuthor. It is a pretty popular program, and should be available easily on most repositories. When you start up QDVDAuthor, you will be prompted for a temp folder, and a DVD folder. Choose two locations on your hard drive for this. Every time you start up QDVDAuthor, the settings will be the same, so go to Tools > Setup to change this if necessary.



The next step is to design the interface of the DVD. Add a background by going to DVDMenu > Add Background. Navigate your system and find a photo you would like to use as the background. Invariably, the photo will not be of the right size, so click yes when prompted to change the size to be suitable for viewing on TV.

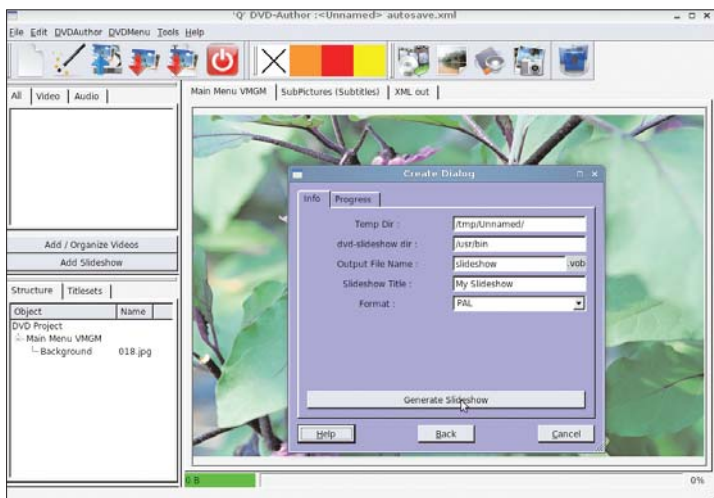


You can add text, with effects and various navigational controls. Go to DVDMenu > Add Text. You can also add videos if you wish. We will skip this to make a simplistic slideshow of images. Go to Add Slideshow > Add images. Navigate your system, select the photos you want to add to the slideshow and import them.



Click on Continue. This will bring up an advanced editor for your slideshow. You can add a soundtrack at this point by clicking the add soundtrack button. You can re-arrange the images in the slideshow. Unfortunately, only the crossfade transition is available here.

Save the slideshow by clicking on Export and choosing a file-name if you are jittery about your work. Then click on OK, and then on Generate Slideshow.



This will take some time. Once the slideshow is created, click on Create DVD. Now click on burn DVD. This screen is just a list of commands that will be sent to the command line to burn the DVD.

Unless you are an advanced user, do not change anything here.

That is it, your photo slideshow DVD should pop out of the tray now.

# Working with audio

## 7.1 Install the MP3 codec

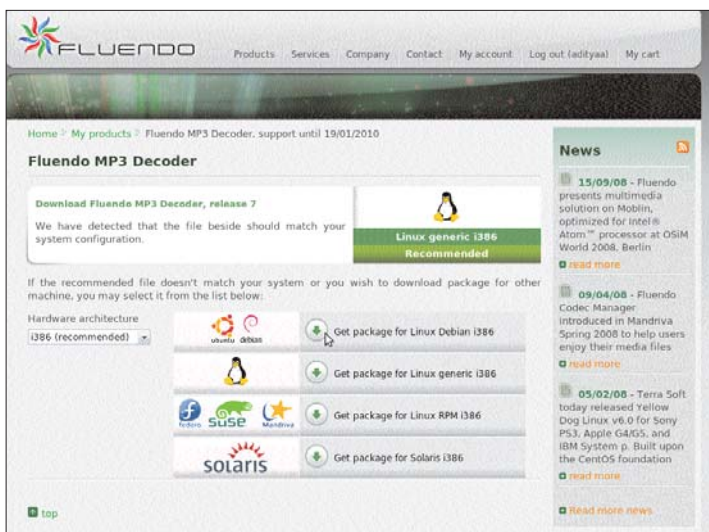
Mp3 is the most common format for storage and distribution of digital music files. Unfortunately, the codec is propriety, so it cannot be distributed free with distros. Some distros like Linux Mint simply give the codec with the distro. Contrary to open source beliefs, most free music on the Internet is also distributed in the mp3 format. Installing the codec on a Linux distro, while not exactly painful, is a irritating process.

One of the easiest ways to get mp3 codecs for Linux is to go to the fluendo shop, which lets you purchase the codec for zero Euros. The url for the mp3 codec is <http://tinyurl.com/fluendo>. When you go to this link, it will ask you to check out the mp3 codec. Don't worry about it, just continue. The next page will ask for a registration. Enter your e-mail id, a password and some personal details that you can make up. What you will receive next is a checkout slip.



The next page has the downloads. So continue to the downloads page. This lists a number of operating systems that you can download the mp3 codec for. If you are in doubt, select the generic Linux codec.





Rpm packages of xmms with the mp3 codec included are available at <http://staff.xmms.org/priv/redhat8/>. The mplayer package of Linux codecs includes the mp3 codec. Go to <http://tinyurl.com/mpcodecs> and download the file named all-20071007.tar.bz2. Once you obtain this file (a 13 MB download), unpack it using the tar command, then place the contents in both `/usr/local/lib/codecs` and `/usr/lib/win32`. If either of these locations do not exist, make them.

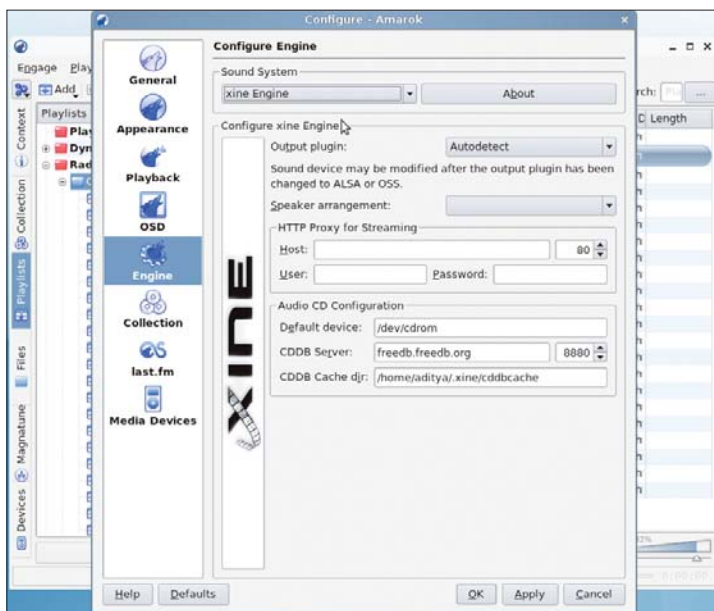
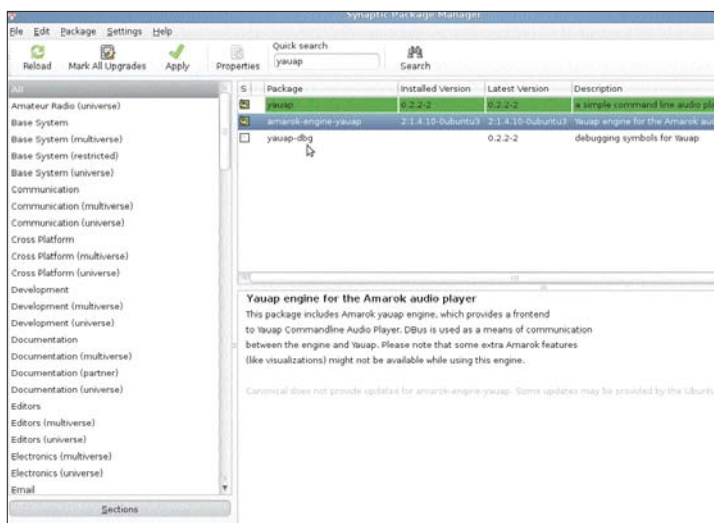
## 7.2 Play music files with Amarok

Amarok is the music player of choice for many Linux users. Although it is included in almost every repository, just the player is not enough to play mp3 files. The way Amarok works, you have to first install an engine. Go to the package manager, and search for both the yauap and the xine engines.

This step is important for Amarok to be able to play music files at all. Start up Amarok, then go to Settings>Configure Amarok>Engine and select either the yauap or xine engines, and see which successfully plays mp3 files on your system.

The more you use Amarok, the more of its features you will dis-





cover. It automatically scans folders on the first startup for music, and arranges music alphabetically by artist. To Build a collection from scratch, go to Context, and select the Build Collection button. You can right click on an album or artist in the context menu and select load playlist to enqueue all the files in a playlist. An interesting feature called the Dynamic Playlist suggests songs based on what you have already listened to.

## 7.3 Transfer music to your PMP / How to use your iPod on Linux

Most modern mp3 players do not rely on a particular software for transferring music to and fro from them. This is because there are severe portability issues, and a PMP often doubles as a portable memory device, which is why there are no restrictive software conditions imposed on them. Because of this, it becomes an easy matter to transfer files to and fro from Linux machines, as the PMPs are detected as external memory.

As soon as you plug your PMP into the system, in most distros, an icon will show up on the desktop leading you to the files on the PMP. Just open this folder, and copy files from or to your PMP.



Transferring music to your iPod is almost as easy. iTunes works perfectly fine with Wine, and all you have to do is install iTunes on the system using wine.

Just double click on the iTunes installer, and it should start as long as you have Wine installed on your system.

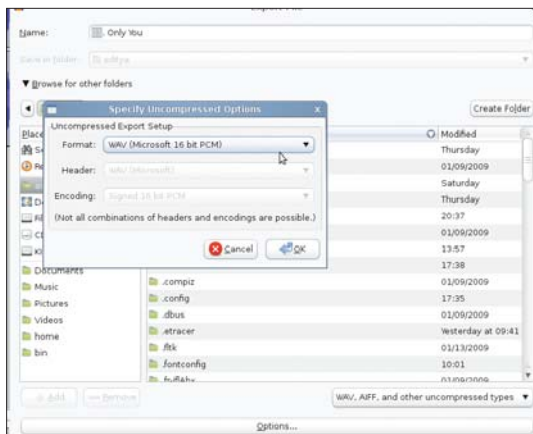
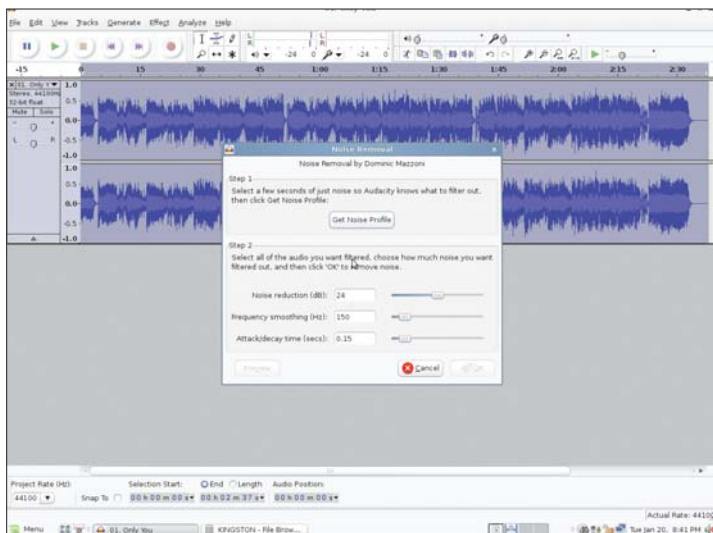
Deselect all Windows specific options during the installation process, like placing an icon on the desktop, adding iTunes as the default player for audio files and automatic updates. Skipping this step won't really harm the system, but iTunes might run in a buggy fashion. If you are prompted to turn on Autorun, click on No. If the screen blanks out in the middle of the installation, don't panic, just wait it out for the installation to complete. Once this is done, you can run iTunes just like it would on a Windows system.



## 7.4 Edit audio files with audacity

Audacity is a great free audio editor, popular even amongst Windows users. It is a small but powerful software. This is an overview of some basic tasks you can do with Audacity, but there are many more you will discover as you explore the software.

Load a track by going to **File > Open** and selecting a file. To trim a track, select the portion of it that you want to remove, and hit delete. To reduce noise, select the entire track, go to **Effect > Noise removal**. Tweak the settings and click on OK. This step will take some time, and you will have to make two or three passes to reduce the noise properly.



To record audio, press the round circular red button. You will get a number of options to save the file as. To transcode, go to **File > Export > Advanced Options**, and select a suit-

able format. Wav and Flac are lossless high definition formats, whereas ogg and mp3 are lossy formats, but give better compression. For more options, click on other. The lower the bitrate, the smaller filesize will be.

To generate a tone, for testing speakers, or putting a test signal before a track, go to Generate>Tone. There are three methods of generating a tone. You can also use the generate menu to generate white and pink noise. To play around with the track, look into the effects menu, there are a wide range of effects and plugins you may like to use.

.....

There are two common video players, but one that is universal. Both players are very good in their own right. Unfortunately, few distros provide all the videos that you need. It is an exception in this case. Video formats than Windows Media Center player of choice for many Ubuntu users, the simple



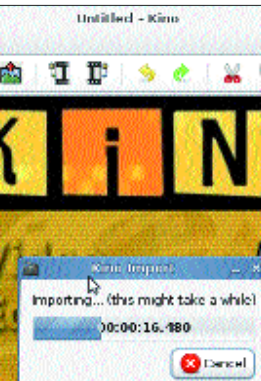
files can be compressed  
rent range of compromises  
source community uses  
vorbis for audio, but file  
players for linux store codecs  
lib/codecs or /usr/lib/win32  
you will need root access  
they don't, create them  
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and download the file, which  
ux. These codecs have  
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then copy and paste the  
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common codecs in the v  
Mplayer's official site is a  
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p://tinyurl.com/klitelinux  
o just wget it. Again, un

se Xine is actually a library  
d from <http://xinehq.de>.  
UIs that actually let you  
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## eo codecs

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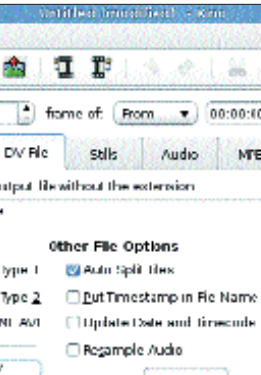


or burn the data on a DVD.

## on Linux

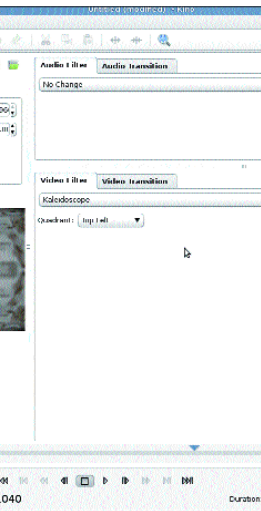
.....

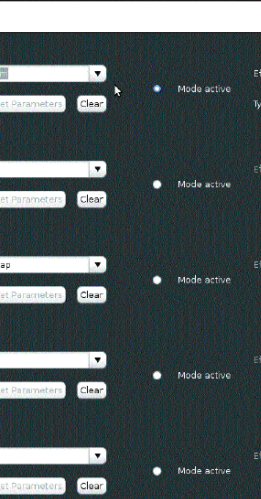
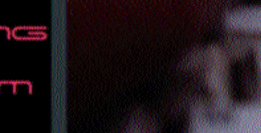
video editor for Linux. The interface is very simple. On the left hand side panel, you can add video to the stack, select insert or replace. For each object in the storyboard, you can set the start time, you will have to trim the video. If you have to use multiple clips of the same file many times, you can also add a few basic transition effects. Unfortunately, it is not available at the time in Kino.



transferred over a network faster than video transfer. It is independent of brands and applications to capture. Since users prefer a firewall, there should be no difference.

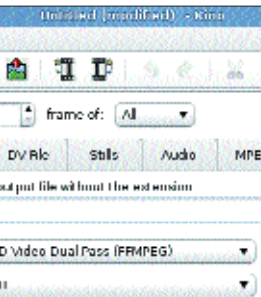
to editor and capture tool. To use on Kino, connect the capture tab, (View>Capture





the Live Vjing mode, which is a common video editing format. If you want to edit in real time, while recording, you can then continue to edit in real time, while recording. Editors are very small files that can accomplish as much as some of the really is no free program with the same function. Linux will do for most editing for something like that. It is not advisable.

## Videos



mat and click on export.  
ly, you will need to inst

# Gaming on Linux

Gaming on Linux has been stuck in limbo for a long time. Publishers don't release games for Linux, primarily because the market is too small, and gamers don't switch to Linux because you cannot play the latest games.

Some publishers like ID and Epic, do release versions of their games that are native to Linux. This is a natural consequence of the robustness of their game engines, which easily run across operating systems. You also know that these publishers are not exploiting the intricacies of the Windows operating system for their benefit, and that they trust the gaming community. Many of the popular games like Unreal Tournament, Quake, Serious Sam, Return to Castle Wolfenstein and Neverwinter Nights are all available natively for Linux.

These and more can be purchased from [www.tuxgames.com](http://www.tuxgames.com). There are also a number of third party porters who port games for Linux, and resell them. This means that at least for the present, Linux simply does not support the bleeding edge in gaming – it takes a while before they start appearing for Linux.

One of the biggest setbacks for gaming on Linux has been the monopoly of proprietary standards. Drivers for gaming peripherals and hardware cannot be distributed along with free distributions. The largest gap in capabilities is because of DirectX. Open GL is good, but is not as good as DirectX.

However, there are a number of emulators available that let you play games made for other platforms on Linux. PlayOnLinux, Cadega and Wine are examples. Wine, is, by far, the most widely used (the other two emulators are also based on Wine), but does not work with all the games, and works differently on different computers.

We will cover Wine in more detail later. One of the mainstays of the Linux community has been the openness of the coding, and the collaborative effort on creating software. This holds true for games as well, and a number of games for Linux have come out from the open source community. These games range from first person shooters to flight simulators, and are a completely satisfying experience for a casual gamer. A great resource for a somewhat comprehensive listing of games available on Linux is available at [www.happypenguin.org](http://www.happypenguin.org).

There are several reasons why Linux is a better platform for PC

gaming than Windows. Most importantly, the Windows OS is heavy on resources. This means that the amount of memory required to just keep Windows running in the background, saps out the processing power available for gaming from a particular hardware configuration. However, even the most resource hungry Linux distro leaves a much smaller memory footprint than XP, let alone Vista. This allows for a game to throw up better graphics and better frame rates.

All Linux distros can be recompiled for use with the specific hardware, making them even more economical, and the games even more faster. Indeed, in many a Lan Party, the Linux user in the crowd has enjoyed faster startup times, and an edge in the crucial first few seconds of the game. What this means is that Linux is actually a very good operating system for gaming. It's just unfortunate that good games are few and far between. Despite this, there is a formidable lineup of mature Linux games.

*Sauerbraten* is a good first person shooter available for Linux, a completely mapable game implemented on the Cube 2 platform. Most popular open source games like *America's Army* are available for Linux. Mods of propriety games that have open source codes like *Wolfenstein: Enemy Territory* and *Urban Terror* are popular in the Linux gaming community, with a fair amount of participation for the online multi-player sessions. The *Quake* engine is very popular



for free games, with *Nexuiz*, *Open Arena*, *Warsaw* and *Alien Arena* all based on it. *Warsaw* particularly, looks promising even on a low graphics system.

Racing games for Linux are nowhere close to anything like *Flatout* or *Need For Speed*, in terms of graphics, but *TORCS* (The Open Racing Car Simulator) and *TuxRacer* are games worth checking out. With Linux having a history of being for the technically-oriented, some of the best Linux games around are space combat or space simulators. These include *D2X-XL*, *Battlestar Galactica* and *VegaStrike*.

Multiplayer gaming for Linux also has its dedicated community. This ranges from the MMORPG *Battle For Wesnoth*, to the combat-rpg space shooter called *Vendetta*. *Flight Gear* is a highly technical and very accurate flight simulator for Linux.

One important aspect of getting games up and running properly is installing the drivers for your graphics card. Installing a Linux distro on a machine that has a graphic card might be sacrilegious to many, but it still can be done, and is not that difficult. NVIDIA has been supporting Linux drivers right from the beginning, with ATI joining in as little as four years ago.

By and large, NVIDIA works better than ATI on Linux systems. You can download drivers for NVIDIA graphic cards from <http://www.nvidia.com/Download> (select the right operating system). On the other hand, drivers for ATI can be downloaded from <http://ati.amd.com/support/driver.html>. NVIDIA also offers drivers for FreeBSD and Solaris.

## 9.1 Using Wine to play windows games

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Wine is the best solution to get Windows applications to work on Linux. Wine has been around for more than 15 years, and can handle a lot of applications seamlessly. However, many applications don't work as well as they would have on Windows, and many of the newer games in particular may face problems. Wine (which stands for Wine Is Not an Emulator) also maintains a library called WineLib, which software developers are increasingly adhering to. This simply means that a software developed for Windows will work on Linux through Wine with almost zero additional effort on the part of programmers.

Now what Wine does is add a processing layer between the operating system (Linux) and the Windows application. This



means that running a number of Windows applications on Wine at the same time is not very advisable. However, the combination of Wine and Linux is still faster than Windows XP in many cases, and some of the older games that do not run on XP or Vista run perfectly fine on Wine.

Wine comes as a standard with many distros, but if it does not, go to package manager or software manager and search for Wine. The installation varies from a 6-MB to a 15-MB download depending on the dependencies and the version of the software. The latest beta version of Wine supports more software, but is not as stable. Deb packages for download are available at <http://www.winehq.org/download/deb> and RPM packages are available at <http://tinyurl.com/5pg2w>. Ubuntu, Mint or Debian-based users will require the deb package, and Mandriva, SUSE or RedHat users would require the RPM package. When Wine is installed, it adds itself as a separate category in the applications list. Notepad is one of the few programs given as a default along with Wine.

Wine uses a directory inside the Linux file system as the C drive of a Windows system. Normally, this address is `/home/user/.wine/dosdevices/c:`. All the games that you want to install, should be installed in this location. Installing a game is relatively easy, as the installation will have windows similar to those in the Windows operating system, irrespective of how your Linux distro is themed. You can also copy and paste game folders from another location into this address. Games that run when the files are copy-pasted run particularly well with Wine.

Once the game is pasted, you will have to check for a few things. To see if Open GL is working properly on your system, go to the terminal, and type:

```
$ glxinfo | grep direct
```

If you see:

```
direct rendering: Yes
```

then Open GL is working perfectly fine. If the system does not display the above message, install Open GL again, or update your distribution. Next, go to Menu>Wine>Configure Wine>Drives and make sure that all the CD/DVD drives that you have is detected. This is essential for games that require the CD/DVD to be in the drive to work properly. Once you put in a CD or DVD into the disk drive, there will be a prompt asking you whether or not to autorun. On Linux, the safest thing to do is to click on No or Cancel depending on your distro.

On most distros, an icon for the CD/DVD folder will appear on the desktop. Open up the folder and find the executable file. All EXE files are picked up by Wine automatically. When installing a game, make sure that Wine is not running any other application. Another important step is to install winetricks. Winetricks is a small script to install some proprietary runtime libraries that are required for some games to run. This includes the DirectX 9 redistributable. To install winetricks, search for it in the software or package manager, or type:

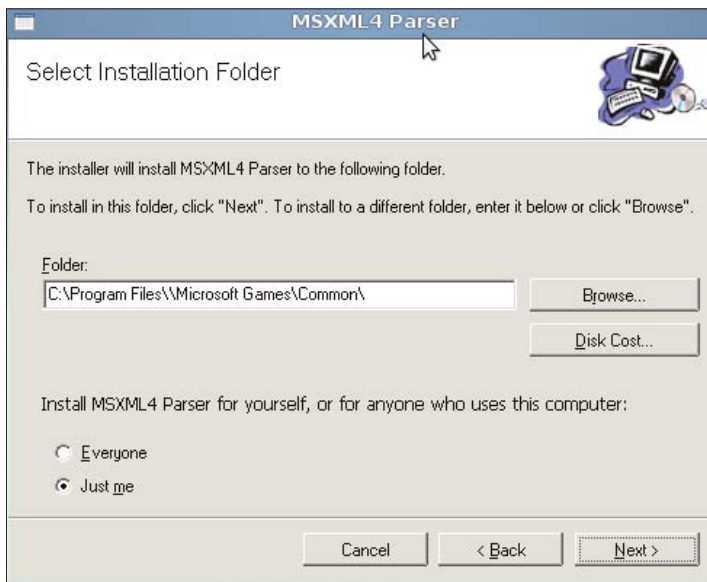
```
$ wget http://www.kegel.com/wine/winetricks
```

in the command line. Now you are good to go for most games.



Wine normally installs the game in `/home/user/.wine/dosdevices/c:/Program Files/Publisher/Game Name`. It is possible to install the game anywhere on the computer, but this is not advisable if the game needs to place files in other folders on the C drive. The Linux desktop will be handled as the desktop for your Windows machine, so that is where the desktop icons will show up. Many games require the Microsoft XML parser, which basically verifies XML code for inaccuracies. This parser is bundled with most installers, and if detected previously, will not get installed. Just

select a directory to install the parser and click on OK if this prompt shows up.



You can now start the game and play away. If a particular game is not working properly, try changing the version of Windows that Wine mimicks. This can be done by going to Menu > Wine > Configure Wine > Applications > Windows Version and selecting a different version of Windows (the default is XP).

One of the most common problems that Wine encounters while emulating games is that the menu of the game might not display properly. The graphical elements will either be missing, or appear as blocks of uniform colour. If this happens, go to Menu > Wine > Configure Wine > Graphics and uncheck 'Allow the window manager to decorate the windows' and 'Allow window manager to control the windows'. This is the most common workaround for the problem.

There may be specific problems apart from these for other games. The workaround for these problems invariably involves modifying some INI files in the system folder of the game so that it is compatible with Wine. The specific fixes for the problems are



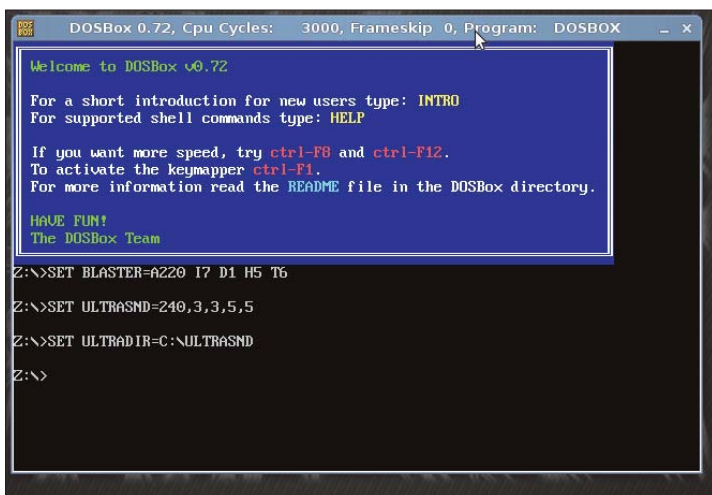
available easily by the Linux community all over the internet, and are pretty easy to follow.

## 9.2 Using Dosbox to play DOS games

Dosbox is the DOS emulator of choice for many enthusiasts who like to play the old DOS games like ~Dave or ~Skyroads. Dosbox is crossplatform, and works on Linux apart from BeOS and Mac OS X. To get the debian installer for Dosbox, go to <http://tinyurl.com/dosboxdeb> and get the RPM installation from <http://tinyurl.com/dos>

boxrpm. The `wget` command from the command line will work on the deb URL given above, but not on the RPM URL. An alternative is through the Add/Remove programs or Package/Software manager in your distribution.

Using the package manager is a wise option, as this takes care of the dependencies automatically, instead of you manually finding the necessary libraries. Now start up Dosbox. Usually, it shows itself under the games menu. Now Dosbox works through the command line, so you will have to learn a few basic DOS commands to operate Dosbox with ease.



`md <directory name>` : Makes a new directory

`cd <directory name>` : Changes the directory to the named directory

`cd..` : Goes up one folder

`exit` : leave Dosbox

`help` : shows help

`dir` : list contents of a directory

`dir/p` : lists contents of a directory with a pause after every pagelength

`cls` : clears screen

Before you start playing games, you have to get a few DOS games. DOS games are available online from several web sites. A good place to start is [www.dosgames.com](http://www.dosgames.com), which has an extensive listing of many DOS games available. Another good resource for

DOS games is [www.abandonia.com](http://www.abandonia.com). This site has a lot of games that were once commercial games, but since then have been abandoned by the publishers, making them abandon ware. Don't think that all these games have a dated game play and bad VGA graphics. Not all of them are small either. GTA for example is over a hundred MB download, and is a perfectly fun old school game. Once a game is downloaded, unpack it into a folder. Save all games in sub folders in a single folder, which will makes it easy to run these games from Dosbox.

Now, when you start Dosbox, the default drive is Z:, which is just a drive that Dosbox uses to start off. You need to mount a virtual drive for you to emulate the games. To do this, type:

Mount C /home/username/games in the Dosbox terminal. Mount is the command to mount a specific drive, C is the drive letter, which can be anything from A to Y within dosbox, and the rest of the text is the path to your games folder. Instead of typing in the entire path, you can also type in

Mount C ~/games, if your home folder has a games folder. The most common error in this step is that the folder does not exist. Note that Dosbox does not work with folders with spaces in them, and gives occasional errors with folders that have a long



name (more than 8 characters). So rename a folder like 'My Games' to 'MyGames'. Also make sure you have not entered Mount C `~/home/username/games`, because `~` stands for `/home/username`. Another thing to check is that you have to get the capitalisations exactly right. So, if the folder name is `MyGames`, entering `mygames` will not work.

If you have entered the address properly, you should get a message like `Drive C is mounted as local directory /home/username/games`. Now type:

`C:`

This changes the drive from `Z:` to the mounted `C:`. The directory structure here is the same as the directories you can see in `/home/username/games`. To go to a specific game folder, type:

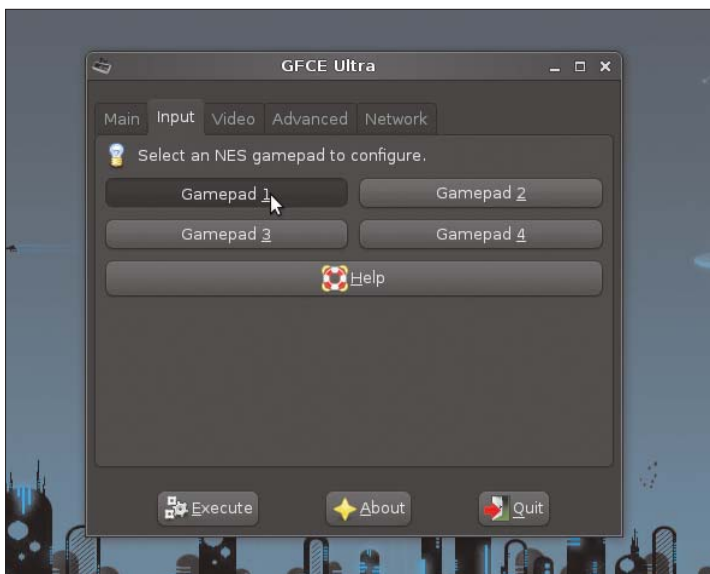
`CD ddavevga`

Now either type `dave.exe`, or just `dave`.

That is it. You can now start playing the game.

## 9.3 Using a NES emulator to play NES Roms

A NES emulator mimicks the Nintendo Entertainment System on your machine to play what are called NES Roms, which are the old

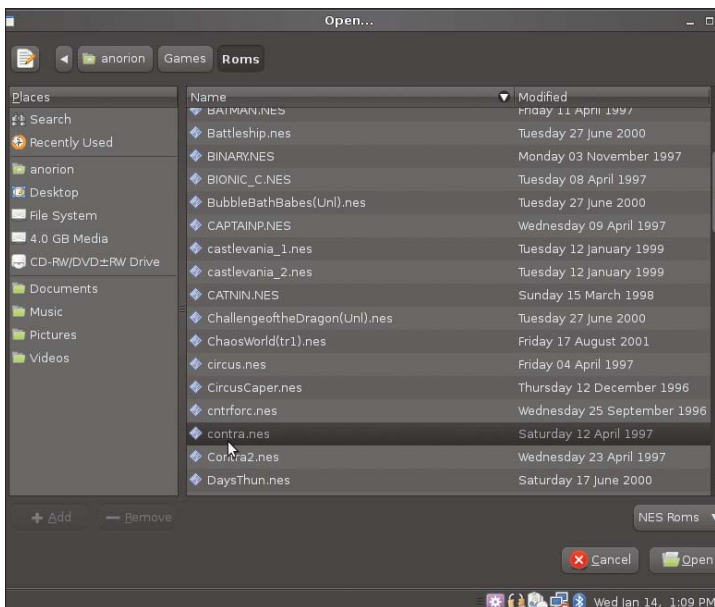


video games that you are used to playing in school. There are a number of NES emulators available, and these are all small downloads. FCE Ultra and TUXNES are two popular NES emulators for Linux. Use the package manager to download and install a NES emulator. Just start it up and search for NES. Depending on your distro, and the NES emulators listed in the repository. A NES emulator should show up. Install one or two of these.

The next step is to get hold of NES roms. Most of these are abandoned, and can be downloaded for free. However, some are proprietary. Head over to [www.romnation.net](http://www.romnation.net) or [www.theoldcomputer.com](http://www.theoldcomputer.com) and look for the ROM files that you need. Here you can find old favourites like DigDug, Contra or the original Mario.

After installing a NES emulator, your first step will be to configure the buttons before you play a game. In most emulators, this configuration is done by selecting a button with the mouse, and pressing the keys on the keyboard you want to use for that button.

In FCE Ultra for example, click on the Gamepad you want to





configure, and a window will pop up with a list of movement and action buttons. Press the button on the keyboard which you want to use for that particular function.

After downloading NES roms (most of them are less than 100 KB), unzip the files if they are packaged into one folder for ease of use. The files will have a .nes extension. Browse for the roms and load them in the emulator.

That is it, you can start playing now. Some emulators offer multi player modes over the network.



## NOTES

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